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commodore MAGAZINE

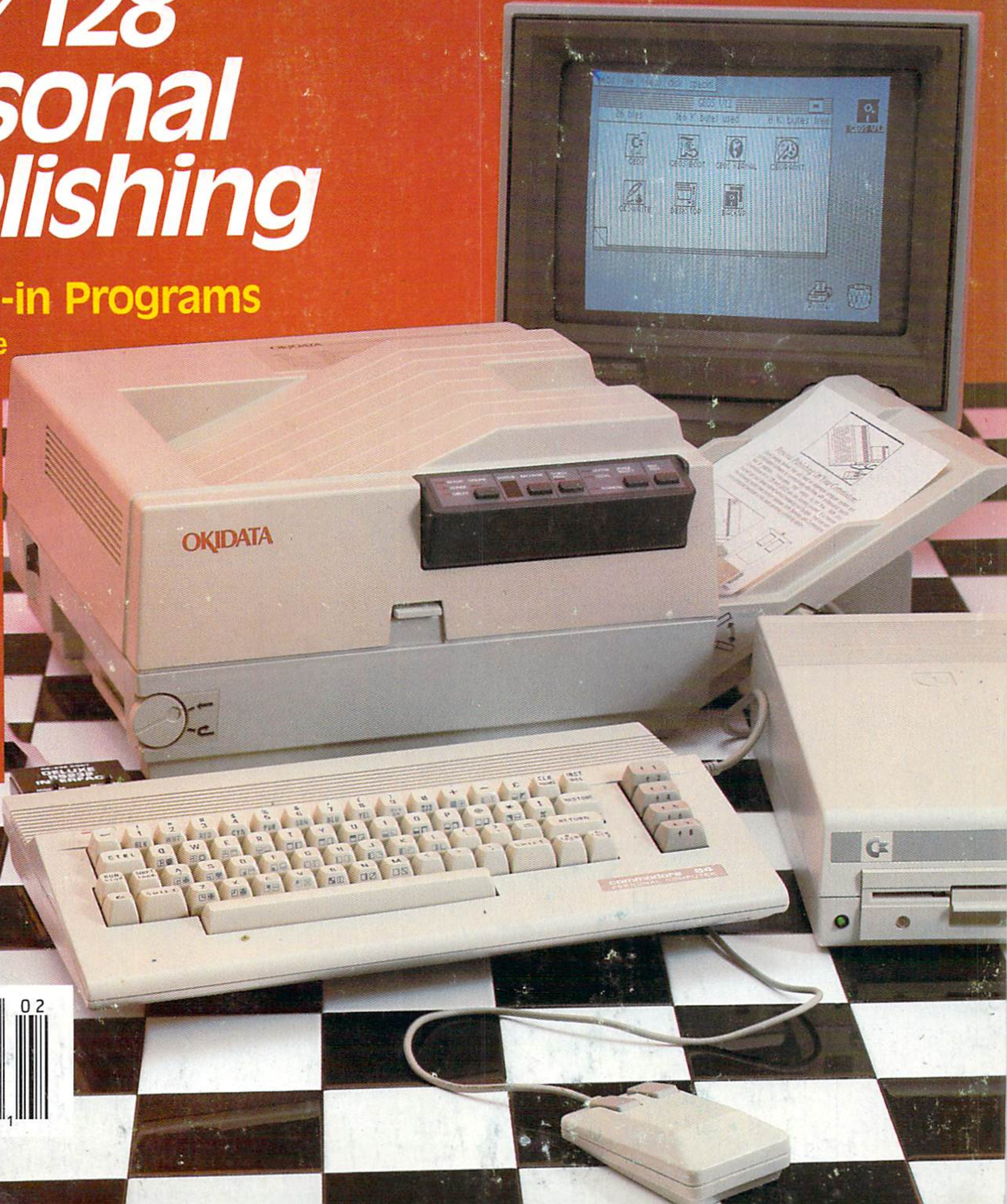
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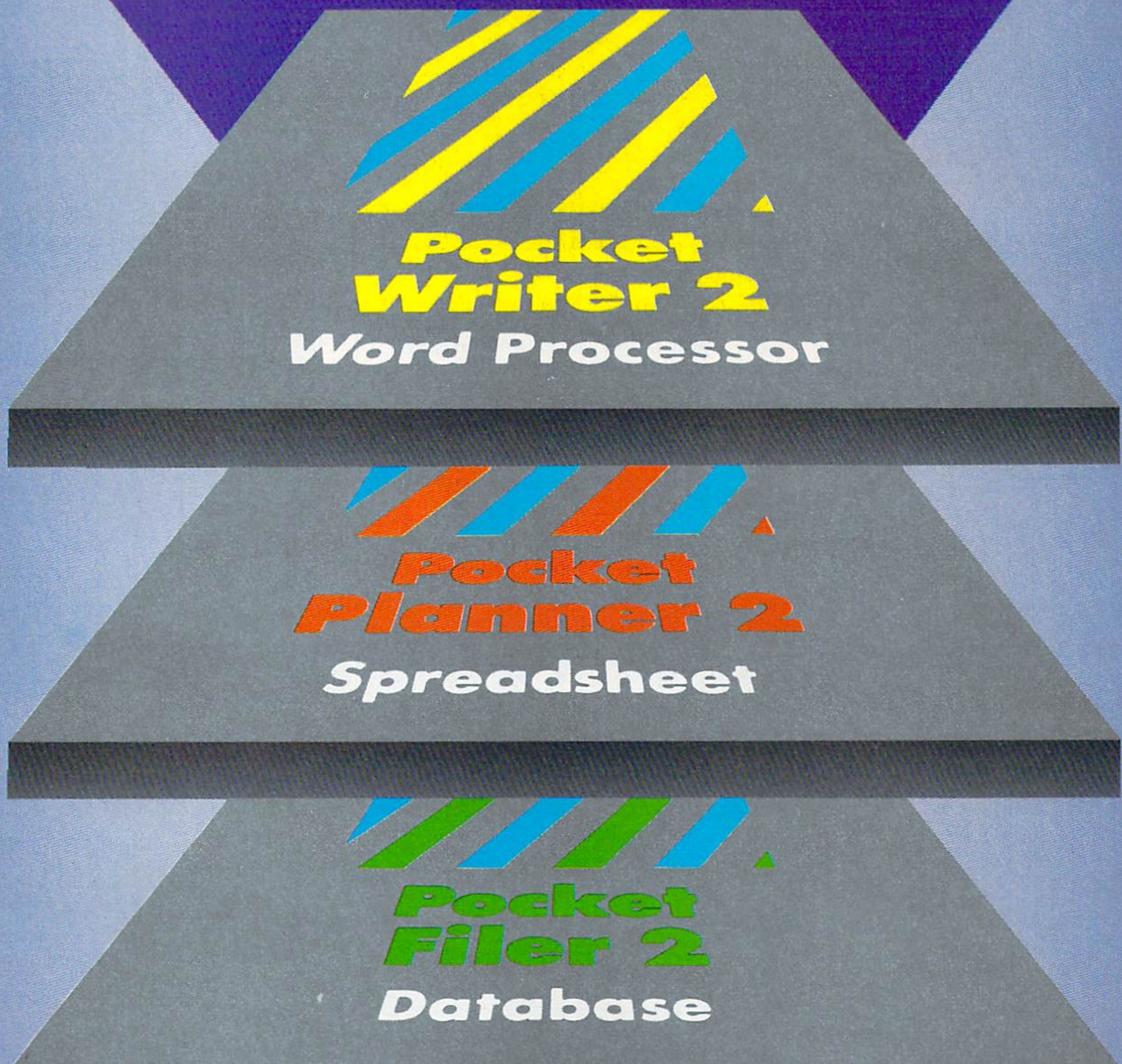
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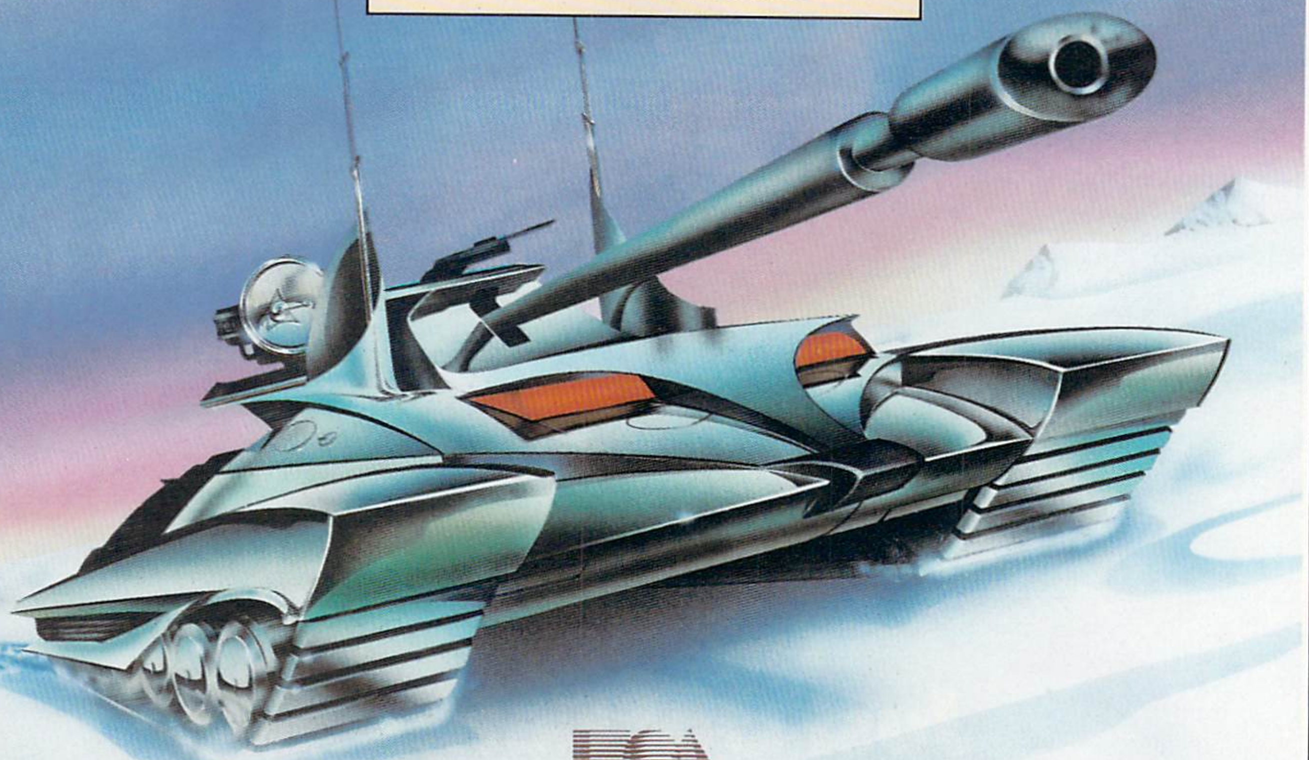
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VOLUME 8, NUMBER 2, FEBRUARY 1987

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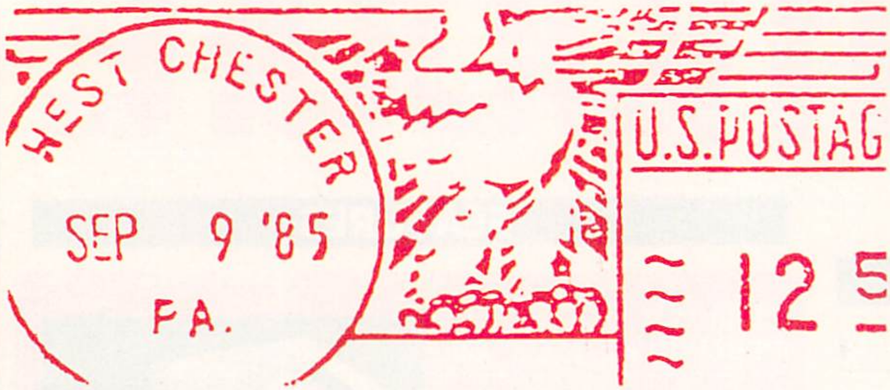
DEPARTMENTS

FEATURES





LETTERS



To the Editor:

I am writing in response to George Zimmerman's letter in the June/July, 1986, issue about software piracy. Zimmerman stated that protected software damaged hardware, was overpriced, of poor quality, and inconvenient to use. I would like to correct these points.

Zimmerman first stated that protected software damaged hardware. The only damage I have ever heard protected software accused of causing is knocking a disk drive out of alignment. (Even though I have been using protected software for years, I have never had this problem.) Even so, this problem is temporary at worst, requiring just a trip to the repair shop. There are even some companies offering do-it-yourself alignment kits at reasonable costs.

Zimmerman also said protected programs are overpriced. However, protection schemes are not what drive prices up; it is people copying a friend's software instead of buying it that does. This reduces the number sold and forces prices to go up. The same principle applies to shoplifting (which is what piracy basically is). Copy protection schemes are usually not complicated enough to need a price increase. I'll agree that most good software is expensive, but that is the price we must pay for those who are too stingy or greedy to go out and buy their own software. Copy protection, like a store security system, is designed to protect us from having to pay for a crook's free prize.

Also stated was the law that allows owners to make one copy for back-up purposes only. This is quite unnecessary since most companies will sell you a replacement copy for a minimal fee. Even without this policy, most software should last indefinitely, barring any accidents (spilling coffee on it, picking it up with an electro-magnet).

On the subject of whether or not software can live up to its advertising, it is mostly a matter of opinion. I agree with him that it is too expensive to use trial and error with software. So how is the consumer to know good software from sloppy, cumbersome software? A good way is to read the reviews in magazines such as this. In fact, that's the reason reviews were put in magazines in the first place!

The companies seem to have protected Zimmerman better than he thinks. I don't think he's been raped at all.

Al Metz
Louisville, Kentucky

Tips & Tricks

To the Editor:

I am writing in response to Louis Sander's "1571 Quirks" in Tips and Tricks in the August/September, 1986, *Commodore Power/Play.* Mr. Sander was in error when he said the 1541 formatted a single side to 644 blocks. It formats to 664 blocks.

Dan Stephans II
Minneiska, Minnesota

DATA Statement

To the Editor:

Many of the programs in your magazines consist mainly of data. Very long programs are hard to type in correctly, and mistakes can even pass through the magazine entry program.

If such a program doesn't work, errors in data can be found by first deleting all program lines except the data. Next, replace these lines with a FOR-NEXT loop and a READ statement. Then, use a voice synthesizer to say each number while you watch the article.

Bob Trocke
Kenosha, Wisconsin

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Commodore Magazine, Volume 8, Number 2, February 1987, ISBN 0-88731-066-4.

Commodore Magazine (ISSN 0744-8724) is published monthly by Commodore Magazine Inc., 1200 Wilson Drive, West Chester, PA 19380. U.S.A. U.S. subscriber rate is $35.40 per year; Canadian subscriber rate is $45.40 per year; Overseas subscriber rate is $65.00 per year. Questions concerning subscription should be directed to Commodore Magazine Subscription Department, Box 651, Holmes, Pennsylvania 19043. Phone (800) 345-8112. In Pennsylvania (800) 662-2444.

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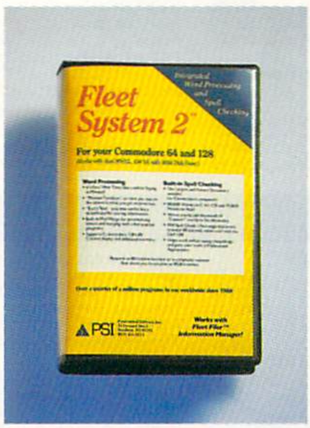
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BY ROBERT W. BAKER

Inside QuantumLink

Explore the inner workings of the QuantumLink telecommunication service with network pro Bob Baker.

Expressions

One of the most exciting things about QuantumLink is the interaction with other people—during auditoriums, through on-line messages and E-Mail, message threads within the message boards, People Connection, and now within *Habitat.*

Before *Habitat,* users relied on simple QShorthand graphics to represent facial expressions. These simple "faces" are still used in E-Mail and on-line messages along with other more elaborate graphics. There's a few download files within the Beginner's Booth in CIN that define some of the more common faces and how to create more elaborate QGraphics.

The faces you'll see most often are :) or :> for smiles and :(and :< for frowns. If you turn your head sideways to the left, you should be able to envision the eyes and mouth of a face.

If you want to get fancy, you can add a wink (;)), a cry (:'(), a kiss (:*), a hug ([]), or stick your tongue out at someone (:P). If you're angry (>:(), surprised (:o) or dismayed (:/), you can let it show as well. If you're wearing glasses (8)), just be careful how hard you laugh (:D).

Another form of expression within messages is to use a few colons to set off a word or two. This lets you say things that don't translate into facial expressions easily and get your point across better. They're a little longer to type than QShorthand faces, but you can do much more with them.

On-line Conferencing

When participating in on-line conferences, be sure to follow the procedures outlined by the sysop or whoever is hosting the meeting. This way everything will run smoothly. This will also allow everyone to get in on the conversation.

Generally, most sysops like to have you send an exclamation mark (!) when you want to say something. Then they give you the go ahead when it's your turn. Just be sure to be ready for your turn when it comes! You can even type ahead and have part of your message ready in your input buffer. Just type the text, but don't hit the return key to transmit the message until given the OK.

When participating in auditorium events, please be patient with those running the auditorium. I've been helping Jim Oldfield with the Midnite Auditoriums for some time now, and know what it's like from the other side. Believe me, it can get very hectic at times!

The questions and messages you enter are put into a queue that the auditorium masters read one at a time. With any reasonable participation, there can be quite a few questions before yours in the queue. Just be patient, they will get to your question in time.

The auditorium masters must have a special menu up on their screen most of the time in order to read and process questions in the queue. This menu allows reading the next question, transmitting it for everyone to see, or passing it to another auditorium master. While the auditorium master has this control menu displayed, it can be difficult to answer on-line messages, since this requires going to a different menu. Try to avoid sending on-line messages to any auditorium master, since this only slows things down.

When more than one person is running an auditorium, they all can read and answer questions from the queue. However, they have to be careful not to interrupt each other. The system includes a simple safeguard to protect against this. When a question is displayed by one auditorium master, another master cannot display a question until the current one is answered.

Don't forget, you can also input comments concerning any of the topics discussed in the auditorium. The auditorium masters have the capability of displaying any entry they read from the input queue as a comment rather than a question. The heading at the left of each message displayed in the auditorium will indicate whether it was a question or a comment. Answers will have the auditorium master's ID displayed at the left to identify who responded.

Hot Off the Wire

On the news front. . . . Rabbit Jack's Casino should be making its debut by now. This Las Vegas-type casino lets you play Blackjack, Five Card Stud Poker, Bingo or the infamous Slot Machines. The games are presented in high-resolution graphics with animation and sound, and you can talk to other players while you're playing.

You're issued Q-Chips to play with, and there's a Cashier in the Casino Lounge where you can check your balance or transfer Q-Chips to your friends. You'll also find postings of the players with the greatest number of Q-Chips and the biggest pots won. The Q-Chips have no real monetary value, they're only tokens used for playing the games.

In Blackjack you can play against the computer or sit at a table with up to four other players. For poker there must be at least two players, because the computer only deals in this game.

Bingo is just what you'd expect: get a card and be the first to cover numbers in a row to win. If you want, you can even play this one by yourself. The Slot Machines are a solitary game, but you can chat with other people in the slot row with you. There's even Progressive Jackpots!

On the *GEOS* front. . . . if you're currently using *GEOS,* or just thinking about it, you should seriously consider dropping by the *GEOS* section of CIN on Q-Link. This area is expanding rapidly and heavily supported by several individuals from Berkeley Softworks. Besides the *GEOS* message boards, you'll now find public domain libraries just for *GEOS* support, including various printer drivers that are now available.

Bob Baker is in charge of the New Products Information area on the QuantumLink network. He can be reached on Q-Link via E-mail addressed to RBAKER.

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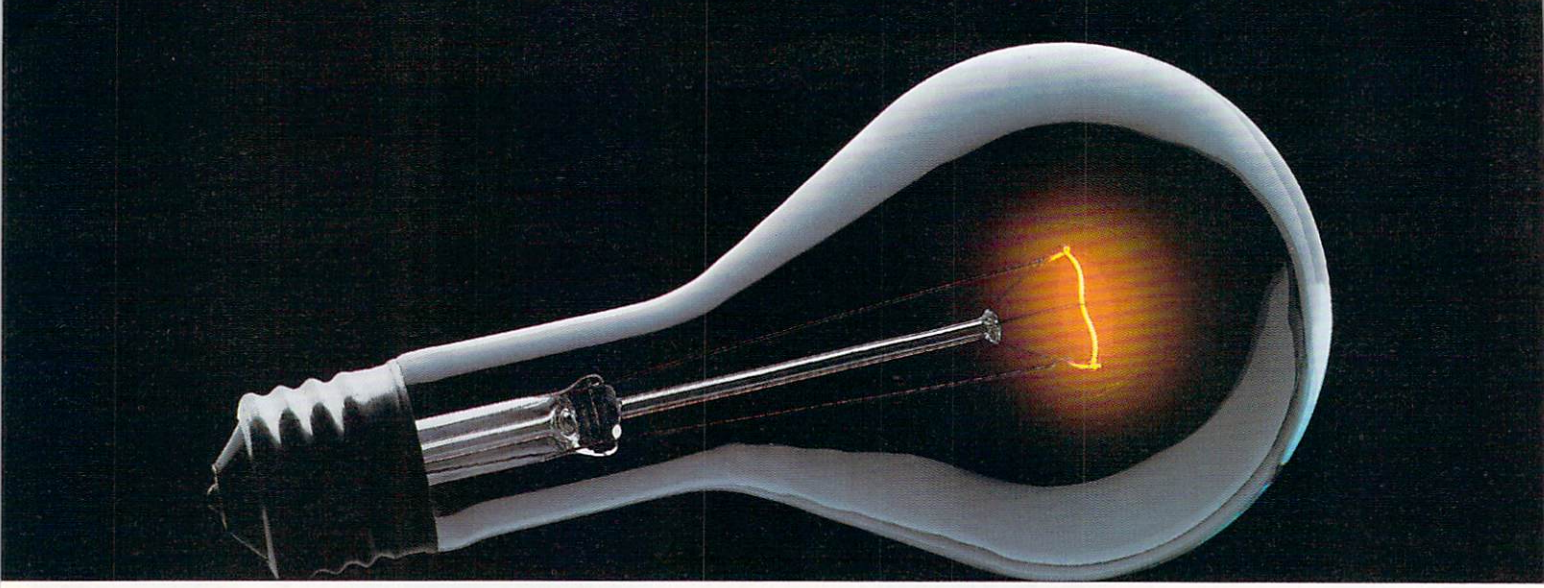
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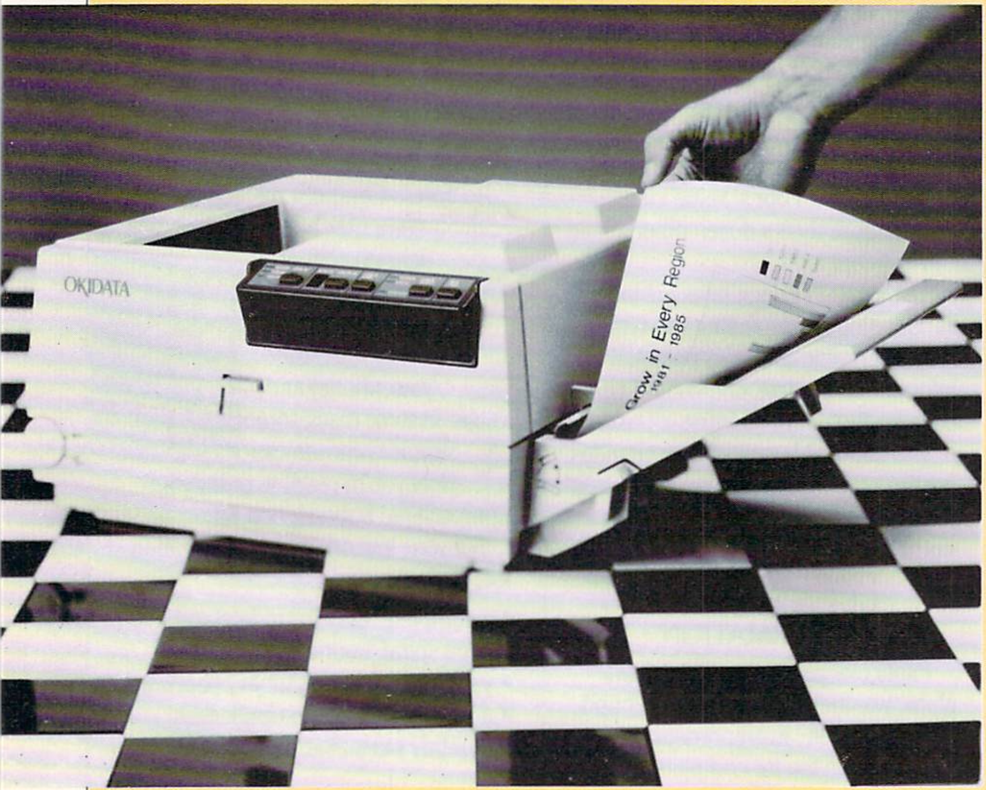
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COMMODORE'S **NEWS** FROM THE FRONT



Laser Printer

The first in a new family of laser printers, the six page-per-minute Laserline 6 from Okidata features plug-in personality modules that enable up to three users to share a single printer. The Laserline 6 also includes 15 resident, typeset-quality fonts and provides face-down correct-order stacking of letter and legal paper.

The Laserline 6 has a 128K page-image buffer. An optional memory expansion cartridge of 384K expands available page memory to 512K for loading additional fonts. The printer has a rated life of 180,000 pages or five years.

Retail price for the printer is $1,995. For more information, contact Okidata, 532 Fellowship Road, Mt. Laurel, NJ 08054, 609-235-2600.

Robot Rascals

Half computer game, half card game—Electronic Arts' **Robot Rascals** for the Commodore 64 features animated robots, colorful playing cards, and plenty of chances to get into some serious mischief.

Choose your robot, then send it on a competitive scavenger hunt through a dangerous computer play field. Your cards tell you what to hunt for. It would be simple if the luck cards didn't keep wrecking your hand. And if the other robots didn't steal from you.

Somewhere out there in the forests, mountains and swamps are the items you need. But search with care, for some kinds of terrain will trash your robot. And if your robot is damaged, you must go home for repairs. Home is also where you go when you want to avoid getting robbed—or when you want to claim victory.

Robot Rascals is a game for two to four players of all ages. It retails for $39.95. (Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404)



PROGRAMMERS: DAN BUNTEN AND ALAN WATSON

The time: 1400 hours. Somewhere in the Pacific. Some ill-fated coordinates in World War II.



Damage Control reports a hit on the starboard side. Send in Alpha, Baker and Charlie to repair.

eyeball to eyeball action. This time around you'll be right in the middle of it all. You knew it wouldn't be pretty.

But how tough could it be to rescue a downed pilot?

Will it be the twin 40mm Bofors anti-aircraft guns? Or the 5″ lead-spewers aft? Depth charges or torpedoes? Autopilot or guts?

LIFE, LIBERTY AND THE HAPPINESS OF PURSUIT.



Radar spots inbound Zeroes. Ready forward gunnery positions. Man the anti-aircraft turrets. They're coming.

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You've embarked on the first simulation that actually combines the intricate, large-scale strategy of wargaming with the intensity of furious,

It sure seemed a lot easier than shelling islands, escorting a convoy or hunting subs.

Or so you thought. But now look what you've got. Thirteen fully-operational, ear-bursting battle stations to worry about, all armed to the gills. Not to mention radar. Navigation. Sonar.

And half the Japanese fleet crawling up your spine.

Time to make some tactical decisions.

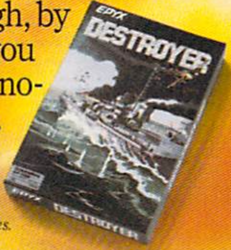
YOU'VE ALWAYS DREAMED OF BEAUTIFUL MODELS. Now you can pick up an entire assault fleet, including a replica Fletcher Class Destroyer, from Revell. Or win an authentic scrambled eggs *flight deck cap. Sweepstakes details are in every box, or write for an entry coupon. No purchase necessary. Sweepstakes ends June 15, 1987. Official rules are available at participating dealers.*

Any choice could be your last, so make it good.

Suddenly, you hear the ominous rumble of incoming Zeroes. You fire, and send one plummeting to the sea, trailing a plume of smoke.

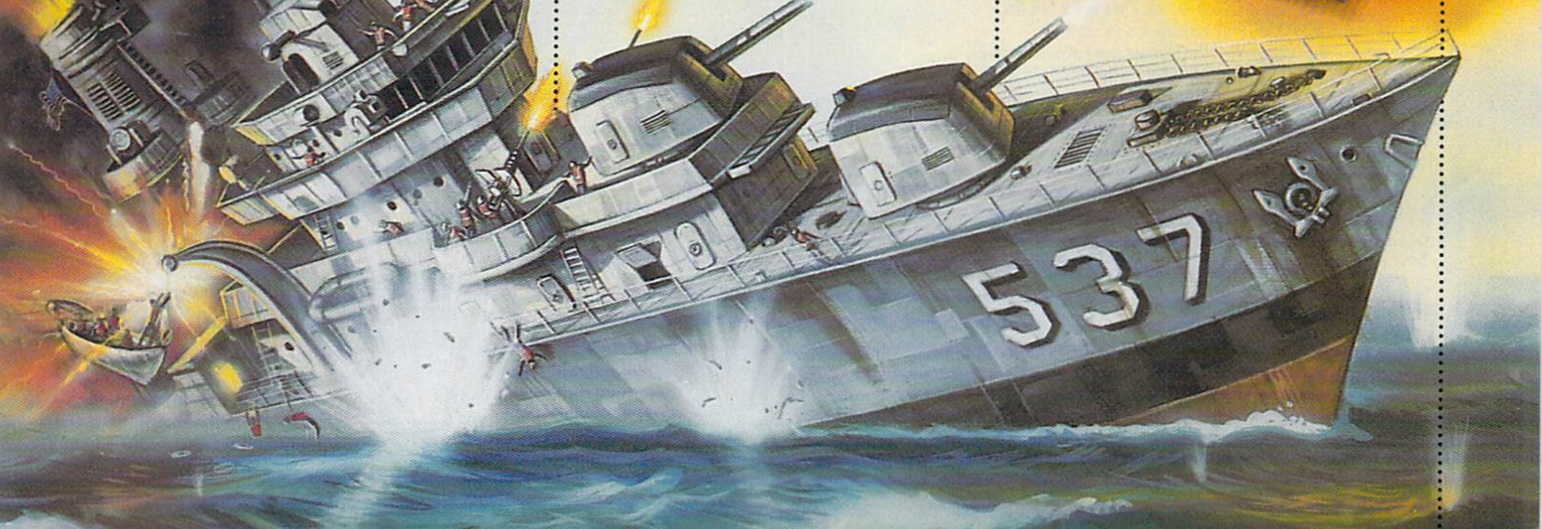
On instinct, you instruct the bridge to commence evasive maneuvers.

Even though, by experience, you know there's nowhere to run.



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COMMODORE'S NEWS FROM THE FRONT



First Computer Furipheral

Fundamental Design Group's P.C. Beast can make any Commodore computer more friendly. After attaching P.C. Beast to your computer monitor with the self-adhering Velcro™ supplied, you see a more personable machine. It no longer seems like a cold, impersonal product of modern technology, but takes on a warm, almost pet-like personality.

P.C. Beast is available directly from Fundamental Design Group, P.O. Box 1399, Cambridge, MA 02142, (617) 354-5715, for $14.95.

Best of 1986 Update

In the November/December, 1986, issue of **Commodore Microcomputers,** Woodbury Software's phone number was listed incorrectly. Their correct phone number is 201-679-0200.

Tax Time Again . . .

This year, let your computer help. Here are just some of the programs available for that trying time of year. We will update the list as the information becomes available.

Tax Master	**Master Software** 6 Hillery Court Randallstown, MD 21133 301-922-2962	**C64**
Tax Command	**Practical Programs** Box 93104 Milwaukee, WI 53203 414-272-7227	**C64**
Taxaid	**Taxaid Software** 606 Second Avenue SE Two Harbors, MN 55616 218-834-5012 218-834-3600	**C64** **C128** **Plus/4** **VIC 20**

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12 Ft. Joystick Extension	$8.95
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Save your Joystick Ports from damage with this Port Extender	$6.95

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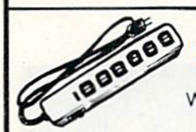


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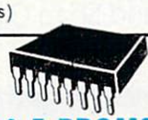


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E.M.C.S. Euphonic Music Construction System

This is a 100% machine language music program for the Commodore 64 and 128. It is the most powerful music program available, designed for anyone interested in music, beginners, to serious musicians.

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- Plays music over 50 min
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The ULTRAVOX Sound System

This system adds an exciting new dimension to all of your sound producing software! 100% stereo sound from your Commodore 64. It even has a built-in amp to power speakers directly.

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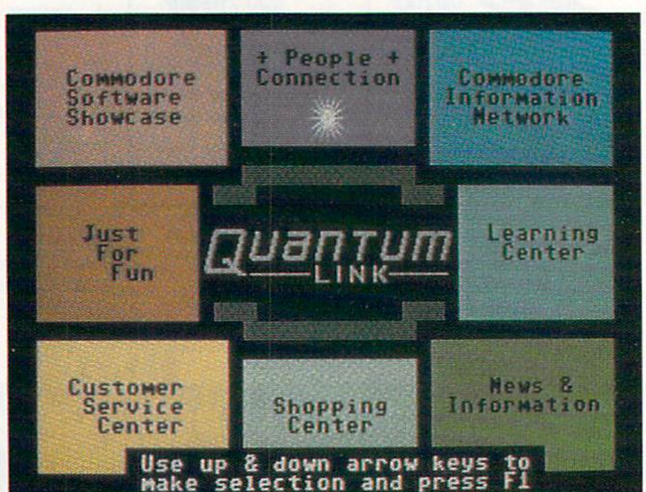
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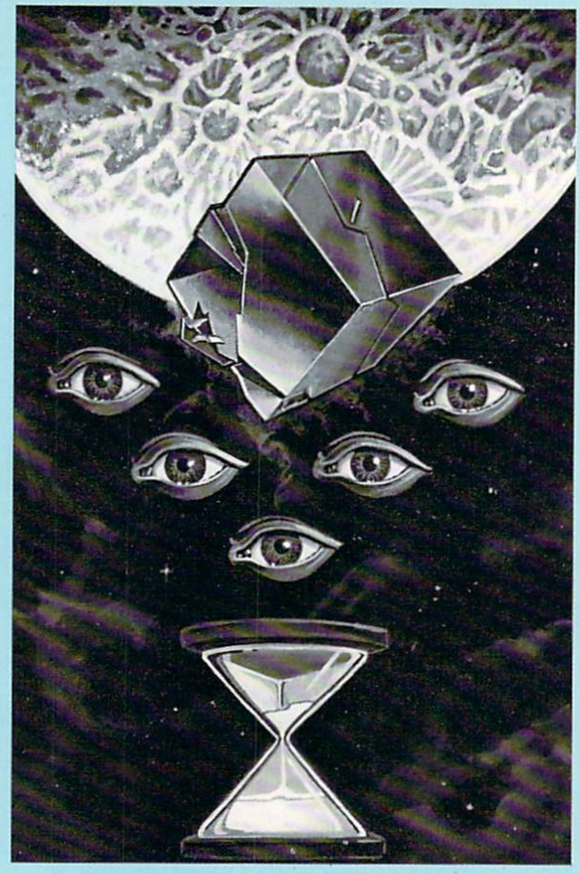
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REVIEWED BY MARK COTONE

Eureka!

Computer: Commodore 64
Publisher: Rush Ventures (U.S. Distributor)
50 Milk Street, Suite 1500
Boston, MA 02109
Medium: Disk
Price: $24.99

Be the first to solve Eureka!*'s puzzle and save the world—and you can claim a $50,000 prize.*



No matter what exotic and imaginative lands you veteran adventurers have visited on your many disk-driven excursions, a trip with Domark's *Eureka!* is bound to touch on some familiar ground. Moving from prehistoric wastelands to modern-day mansions, players travel through time, combing some famous past and present adventure settings in an effort to stop earth's imminent destruction. So grab your flint axe, mace, sword, grenade and semiautomatic, and get ready to face anything and everything.

The story line was composed by England's best-selling mystery author, Ian Livingstone. He spins an intricate tale of science fiction fantasy which centers around the Temporal Talisman, a closely guarded ancient artifact discovered by the astronauts of an Apollo XVII moon patrol. This lunar treasure, a 15-inch cubed crystal of unknown composition, was secretly carted back to earth for closer examination. Unfortunately, when subject to the high-powered analysis of some probing laser beams, the crystal cracked and shattered, launching eight pieces into unknown dimensions.

NASA's disappointment in losing its priceless curiosity was quickly overshadowed by the horror of a strange and violent physical reaction from the place where the Talisman had been exhumed. A strong series of moon quakes immediately started racking the lunar surface at the same instant the crystal was inadvertently destroyed. A noted physicist theorized that the moon would soon disintegrate, sending thousands of meteorites streaming towards earth, unless the mysterious artifact were somehow pieced back together. And so, the mission unfolds.

By tracking a peculiar radio frequency emitted by the Talisman, NASA quickly traced all eight of the missing pieces. Three were promptly retrieved and brought back to the base for safe keeping. The search and recovery of the remaining handful of pieces is the foundation of the *Eureka!* challenge.

Five adventures have been designed to take players on their various hunts. Four of the pieces were actually blown back into earth's historical past, setting up text tours through Prehistoric Europe, Roman Italy, Arthurian Britain, and Wartimé Germany. One final test awaits in the Modern Caribbean, where the last piece is being held hostage by the most infamous of modern day terrorists, Count Hugo Von Berg.

Each pursuit is a separate trial unto itself, using different settings, dangers, villains and comrades to thwart and guide you in the search for the Talisman pieces. It's a quest of incredible scope and staggering magnitude.

The action evolves as familiar cause-and-effect. The program displays a short descriptive paragraph detailing location and situation, waits for an active player response, and then outlines any action. The interactive parser, though a bit archaic when compared to some of its more refined peers, is both functional and accurate. Usually, a simple one-or two-word response is all that is needed to keep the plot flowing.

Two graphic windows atop the screen depict the visual surroundings with colorful static scenes and realistic animation. Occasional audio highlights also add to the atmosphere, creating every sound from orchestrated fanfare to rushing water.

Throughout the game, your strength is measured in "vigour" points. Combat occurs often in each of the adventures, and every hit will sap some of this precious energy. There's no way to replenish your strength quotient once it is lost, so it is a commodity that should be carefully

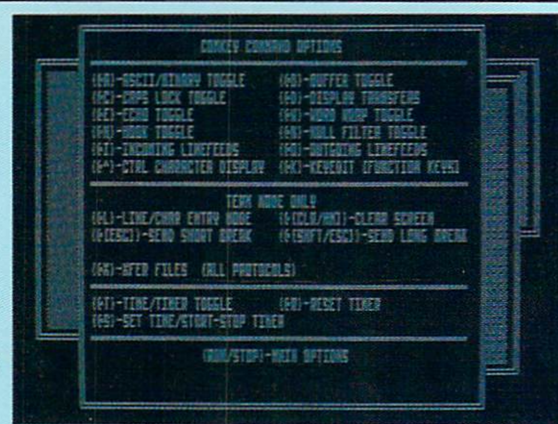
Continued on pg. 125

REVIEWED BY GARY V. FIELDS

BobsTerm Pro 128

Computer: Commodore 128
Publisher: Progressive Peripherals & Software
464 Kalamath Street
Denver, CO 80204
Medium: Disk
Price: $79.95

To use just a few features would be like buying an apple orchard and tasting only one apple.



New explorers on the telecommunications frontier must vanquish obstacles like modems, baud rates, parity, access lines, transfer protocol, networks and surcharges before they can probe the mysteries of their telephone line. Thankfully, a good terminal package can cut through that jungle of confusion. *BobsTerm Pro 128* is such a product.

There seems to be an unwritten rule that requires productivity software to be either simple and easy to use, or powerful but difficult to master. *BobsTerm Pro 128* is a wonderful exception to that rule. It is both powerful and flexible, yet simple enough for a first time user to handle. Because it is entirely menu-driven, even the most timid user can have it up and running in less than an hour.

The program begins with the auto-booting program disk—simply slip the disk into your drive and flip on the 128 to get started. If you are using the 1571 drive, the load takes only a few seconds. The program will work with the 1541 drive, clones or dual drives as well, but will take a little longer to load.

You only need to do three things to get on-line. At the main menu, press P for Parameter Set Options and a new menu window opens listing things like Color, Disk, Modem Type, and Font Style. Here press M for modem and select the proper modem. *BobsTerm Pro 128* supports all the popular modems like Hayes, Mitey Mo, Lynker, Westridge, Total Telecommunications, Hes I and II, and, of course, Commodore's 1650, 1660 and 1670.

After selecting the proper modem, simply press the RUN/STOP key to return to the original menu. Now press T for Terminal Mode. Presto, you can go on-line just by dialing a number.

Telecommunications couldn't be much easier, but to use just those few *BobsTerm Pro 128* features would be like buying a whole orchard and tasting only one apple. What makes *BobsTerm Pro 128* so outstanding is the fact that you can use only the features you need now and master the others at your leisure. This means that the more you get into telecommunications, the more serious *BobsTerm Pro 128* can be.

The screen's top line always displays status that is critical for terminal mode operations. Each option can be toggled on and off by pressing the Commodore key and the first letter of its name. For example, to toggle the buffer on and off requires you press the Commodore key and B. *BobsTerm Pro 128*'s buffer can hold a whopping 60K. I downloaded 18 single-spaced pages from CompuServe and still had buffer space to spare.

Other options include Echo, Linefeed, Null Filter, Hook, Macro, Caps, Word Wrap and both time-of-day clock and a timer. The clock and timer are not only convenient, but can actually save you money. If you use the terminal to access toll networks like The Source and CompuServe, you'll really appreciate the timer. It automatically zeros and starts when you first access a network, and continues ticking until the connection is broken.

But what makes *BobsTerm Pro 128* worth buying is the power it packs. Do you need a terminal which will transfer CP/M, sequential, program or binary files? How about baud rates? *BobsTerm Pro 128* can handle baud rates from 300 to 2400.

BobsTerm Pro 128 can upload and download data using the most popular protocols, including Punter and XMODEM. The ability to handle both was the feature that attracted me first. Because the local bulletin boards I access vary between Punter and XMODEM protocol, I had to log on to Punter boards in 64 mode and use my old Punter terminal program for some boards, and switch to 128 mode and use either *Common Sense* or VT100-128 for others. This required I learn the controls of two different terminals as well as be careful to use the correct terminal with the right board. Now, regardless of whether I'm ringing up a major network or a local mini-board near home, I can use the same terminal program.

BobsTerm Pro 128 separates each function by windows. For instance, if you have captured data in your buffer and want to do something with it, you can select the buffer commands from the main menu. This causes a second window to open, overlapping the main. This new menu lists the commands available at this point: dump buffer to printer, disk, screen, edit, and so on. To edit the buffer, press E. Now the screen displays all the text you have captured, including command and control characters.

Now you can edit, delete, insert, overwrite, format page or change the buffer—just like you would if you were using a word processor. In fact, if you only need a word processor occasionally, you probably can get by fairly well with *BobsTerm Pro 128*'s buffer editor. A help screen lists all the editing options and is only two keystrokes away. And because the buffer can be saved to a disk as either a sequential or program file, you can store it using the file type your word processor uses.

When you think of telecommunications, you should be concerned not only with terminal/modem compatibility, but modem/printer compatibility as well.

Continued on pg. 124

TAKE THE Q-LINK CHALLENGE!

IF YOU WIN, GET THREE PRIZES!

• A MODEM
• A FOUR-MONTH Q-LINK MEMBERSHIP
• LUCASFILM'S *HABITAT* SOFTWARE

HERE'S HOW TO ENTER!

Simply complete the Challenge of the Month and send it with this coupon to Quantum Computer Services, 8620 Westwood Center Drive, Vienna, VA 22180. Attn: Challenge of the Month #________ (fill in the correct Challenge of the Month number).

NAME ____________________

ADDRESS ____________________

CITY ____________ STATE ______ ZIP CODE ________

PHONE NUMBER (_____) ____________

YOU MUST ANSWER BOTH QUESTIONS TO WIN:

Are you currently a member of QuantumLink?

☐ Yes—if I win, extend my membership for four months.
☐ No—if I win, send me the Q-Link software and free four-month membership. If I get the Challenge correct but don't win, send me a free Q-Link software kit as a consolation prize.

Do you currently own a modem?

☐ Yes—if I win, send me a substitute prize.
☐ No—if I win, send me the modem.

Complete the Challenge of the Month correctly and you will be eligible to win a great prize package!

Each month, 20 individuals will be chosen from the pool of correct Challenge entries and the winners will receive a prize package that includes all this!

- **A free Commodore 300-baud modem (Model 1600).** With this modem, you'll be able to hook up your Commodore 64 or 128 to a telephone and access QuantumLink, the official on-line service for Commodore owners.
- **A free QuantumLink four-month membership.** QuantumLink membership normally costs just $9.95 per month, and includes unlimited use of a base tier of services and one free hour of access each month to special Plus services. As a Challenge winner, you'll get QuantumLink software and your first four months membership free!
- **A free copy of Lucasfilm's *Habitat* software.** *Habitat* is the new multi-player game that utilizes the QuantumLink network to interconnect thousands of Commodore owners from across the country. Participants can quest for hidden treasure, investigate intriguing mysteries, and participate in the ongoing drama of this innovative and exciting graphic adventure.

Consolation Prize!

If the Challenge entry you submit is correct, but your name is not chosen from the pool of correct entries, you will be sent a Q-Link software kit for FREE!

CHALLENGE OF THE MONTH #3

Q-Link Cryptoquiz

This cryptogram is a message put into a simple substitution code. Each letter in the message has been replaced by another letter of the alphabet. A letter is always represented by the same letter throughout the message.

DMRAZMCBTAE TF ZOX
NABTAX FXGITLX FYXLTRBBJ QNG
LNCCNSNGX NHAXGF. TZ'F
XRFJ ZN MFX, TAXKYXAFTIX,
MFXQMB, RAS QMA!

HINTS:
—A single letter after an apostrophe is often an S.
—Code letters X, R, M, T and N represent the vowels A, E, I, O, and U, but not necessarily in that order.
—Below is an example of a solved cryptogram. The code used in this example is NOT the same code used in the above cryptogram.

XCRRCBCAF RSLSKVTF
COMMODORE MAGAZINE

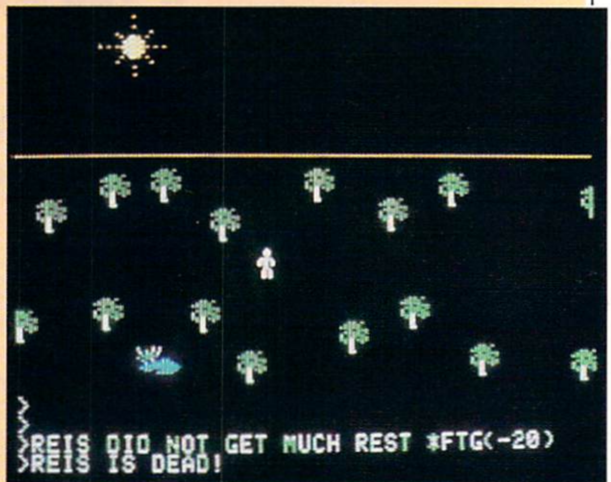
GIVEAWAY HINT: Code letter D in the Q-Link cryptoquiz represents the letter Q.

REVIEWED BY GARY V. FIELDS

Rings of Zilfin

Computer: Commodore 64
Publisher: Strategic Simulations
1046 N. Rengstorff Avenue
Mountain View, CA 94043
Medium: Disk
Price: $39.95

Separately, the rings are but decorative metal bands, but together they generate undefeatable supernatural power.



Evil forces, led by Lord Dragos, have once again enslaved the three kingdoms of Batiniq. But two things stand between Dragos' complete domination of Begonia, Sumaria and Beloria and their people—the two magical rings of Zilfin. The rings were forged in long-forgotten history by the wizards of Zilfin to insure peace for the kingdoms. But through neglect, both the rings and peace were lost.

Separately the rings are but decorative metal bands, but together they generate undefeatable supernatural power. One of the rings has already found its way onto Dragos' ruthless hand. Now the fates have chosen you to recover the missing ring. After you find the ring, you must conquer the evil forces and return peace and prosperity to the three kingdoms.

Rings of Zilfin is a fully animated, three-dimensional adventure. To complete your quest, you must master skills as an archer, swordsman and wizard, because only a Grand Master Wizard can defeat Dragos. Skills are increased by studying, practicing and trading. Thus, to increase your skill as a swordsman, you must study under a swordmaster and survive battles. To receive magical powers, you must find and pay a wizard to teach you, after which you should practice casting spells. But above all, you must increase your endurance level (wizardry and fighting are very fatiguing occupations).

Because gold is required to hire teachers, you must also be a shrewd trader. Each village has a shop where you can buy and sell. You must buy low in villages with abundance and sell high in villages where there is need. Then with your profits you can hire masters to teach you the skills you lack.

During your travels you will be surrounded by monsters, goblins, demons and other unfriendly forces out to rob and destroy you. Just to survive in this evil land will be a test of your skills and wit. Luck, as well as skill, will be required to find the ring and defeat Dragos. So the problem is not just a simple find-the-needle-in-the-haystack puzzle. Instead, *Rings of Zilfin* is a classic good against evil, fight to the death, super mystery.

There is plenty to explore here, including three kingdoms, 27 villages, temples, inns, swamps, mountains and deserts. There are also in excess of 100 talkative inhabitants of this land, whom you can question for information. And, of course, there are dozens of trolls, monsters, goblins, kings, dragons, man-eating plants and flying dangers to encounter.

During the adventure you are treated to a multitude of different screens (many fully animated or scrolling) which will delight even the most critical adventurers.

An average player will need around 30 to 40 hours to complete the quest, but if you are a novice, you should plan to spend twice that time. But don't worry, the game includes an option to save a game in progress, so you don't have to finish the adventure in a single sitting.

Rings of Zilfin is different from any other Strategic Simulations game now on the market. Unlike earlier fantasy games where you were allowed to form a troop of adventurers, this one is a solo quest. You can ask for aid or information from the inhabitants around you, but they will not join you on your travels.

Rings of Zilfin's action is continuous instead of being divided into neat turns as are most fantasy adventures. The only break in this real-time action occurs when you input an illegal command or select the status screen—both free time. The status screen lists all your possessions, weapons, skill levels (magic, weapons), gold, endurance and fatigue.

The graphics here vary from very impressive to fair. The first screen shows a colorful three-dimensional village with smoke wafting from a chimney. The animated hero goes to the window, then dashes out the door down the forest road. Moments later a horned villain approaches the empty house only to find his victim gone. Other screens show the hero walking across marshes, deserts and wooded trails.

The 27 villages are all different, and when the hero enters a building, the interior scene is displayed in a smaller, full-color window. Of course, the cost for all these graphic delights is a lot of disk drive activity. Fortunately, the waits are usually under 30 seconds, and the results are well worth the wait.

Rings of Zilfin can be controlled by either joystick or keyboard input. While joystick jockeys may prefer the magic stick, I found the keyboard much easier to use. Too often while using a joystick I found myself inadvertently picking the wrong weapon for the task at hand—a deadly mistake which is less probable when the keyboard is used.

When the game begins, you are allowed the option to either accept the default directional keys or redefine them to suit yourself. Using either input device is easy to learn, and the back page of the user's manual lists all the commands for quick reference.

If you enjoy a good, life-risking adventure, you'll like *Rings of Zilfin.* The game's arcade action and sound effects

Continued on pg. 124

NUMBER ONE ARCADE HITS...



FOR YOUR COMPUTER.

Put on your black belt and challenge your friends or the computer through nine picturesque settings in this leading Martial Arts Game to become the **KARATE CHAMP**. For the Commodore 64™/128 and the 48K Apple II® Series.

As the crack shot **COMMANDO**,* battle overwhelming odds to defeat advancing rebel forces. Armed with only a machine gun and hand grenades, you must break through the enemy lines to reach the fortress. For the Commodore 64™/128.

Prepare for the fight of your life . . . you are the **KUNG-FU MASTER**.** Battle the evil forces through the five dangerous floors in the wizard's castle to rescue the captive fair maiden. For the Commodore 64™/128 and the 48K Apple II® Series.

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** © Irem Corp. Mfd. under license by Data East USA, Inc.

DATA EAST

DATA EAST USA, INC.
470 Needles Drive, San Jose, California 95112
(408) 286-7074

SCIENTISTS A
DISCOVER NE

When we started our company on the west coast, people thought we were a little spaced out. So you can imagine their reactions when we announced we'd discovered a new universe.

People laughed. People scoffed. And they really freaked out when we told them where we'd found it:

Inside a Commodore 64.

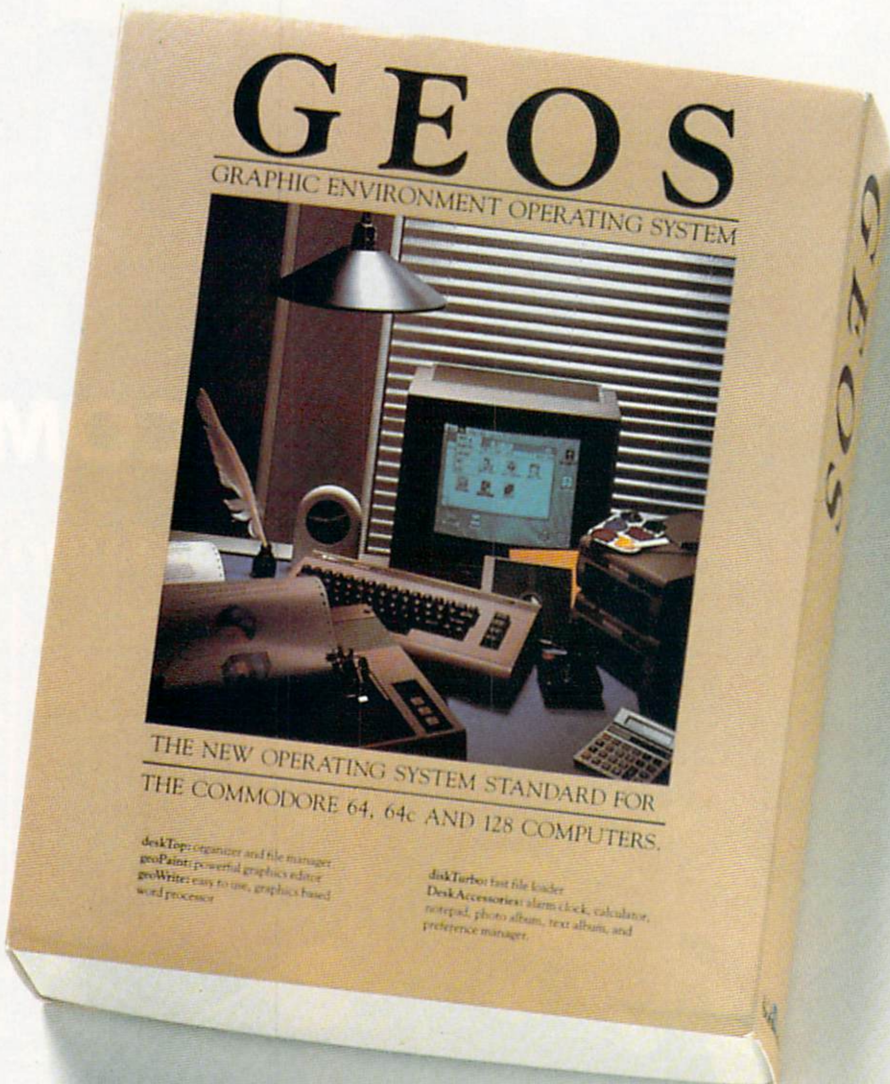
It's called GEOS. And it turns any Commodore into a powerful PC that holds its own against any computer, no matter what kind of fruit it was named after.

GEOS: The superior intelligence. Of course, we always knew Commodores possessed superior brains. It just took GEOS to discover them.

You see, GEOS opens your Commodore to a huge universe that can hold an infinite number of applications. Which means that GEOS can do just about anything the expensive PC's can do, including one thing they can't:

Add even more GEOS applications that are being developed even as you read this.

Increase your speed to warp factor 7. The first thing you notice with GEOS is how its diskTurbo speeds up your Commodore's disk loading and storing time.



Not twice or three times as fast. But five to seven times faster than normal. Which lets you streak through files and documents at what seems like warp speed.

And that saves you endless time.

Every universe comes complete with a desk. The way to keep order in our universe is with the GEOS Desktop. It's just like your desk at home, only without the coffee stains.

The Desktop keeps your art and documents filed, and comes

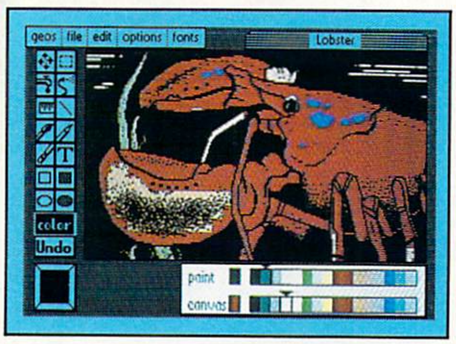
AT BERKELEY
EW UNIVERSE.

with all the accessories you need to keep you organized:

An alarm clock keeps you punctual. A notepad keeps your memos. And a calculator keeps your accountant honest.

How to communicate with a new universe. With geoWrite, you can rearrange your written words. Move blocks of copy. Cut and paste. And even display your text in fonts of different styles and sizes, right on the screen.

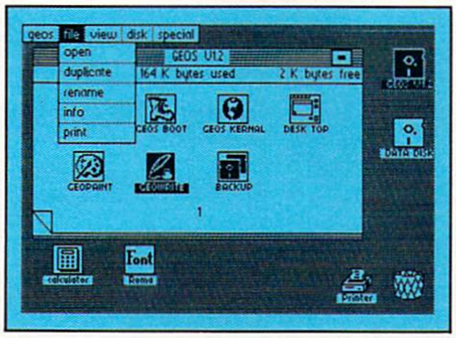
With geoPaint, you become a Michelangelo with a mouse.



Sketching and painting with all kinds of colors, textures and patterns.

You can invert, mirror and rotate images. Insert them into your geoWrite documents. And save them in your GEOS Photo Album for use later.

Finding your way through the universe. The most difficult



thing about a new universe is finding your way around. But with GEOS, you only need to remember two things:

Point and click.

When GEOS offers you options, you just point to your answers and click your mouse or joystick.

You want to draw? Point and click.

You want to write? Point and click.

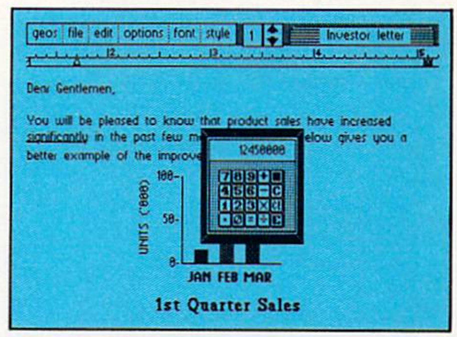
You want to fill in that obtuse rhomboid with an air-brushed geometric pattern in a lighter shade of pink? Point and click.

Easy, huh? And in case you ever do make a mistake, GEOS backs you up with an "Undo" feature that undoes the very last command you entered.

Running out of space. With GEOS, that's hardly likely. Because there's endless space in the universe for new applications.

Unfortunately, there's only so much space in this ad.

So zip down to your nearest software dealer. Tell him you want to explore the new universe in your Commodore.



And if he looks at you like you're some kind of alien, well, just tell him Berkeley Softworks sent you.

The name is universally known.

To order, call 1-800-443-0100 ext. 234
GEOS is just $59.95
(California residents add 6.5% sales tax.)
$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

Berkeley Softworks

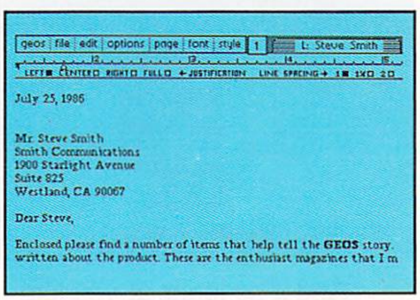
The brightest minds are working at Berkeley.

THE STRON
ARE BUILT WIT

Whether you're building an argument or just hammering out a memo, any project looks better when you put it together in Writer's Workshop. The supercharger that powers your GEOS-equipped Commodore through even the most wrenching assignments.

Sharpen your skills. The first thing to do in the Workshop is plug into geoWrite 2.0, which contains all the brand new tools you need to hone any rough concept into a well-crafted document.

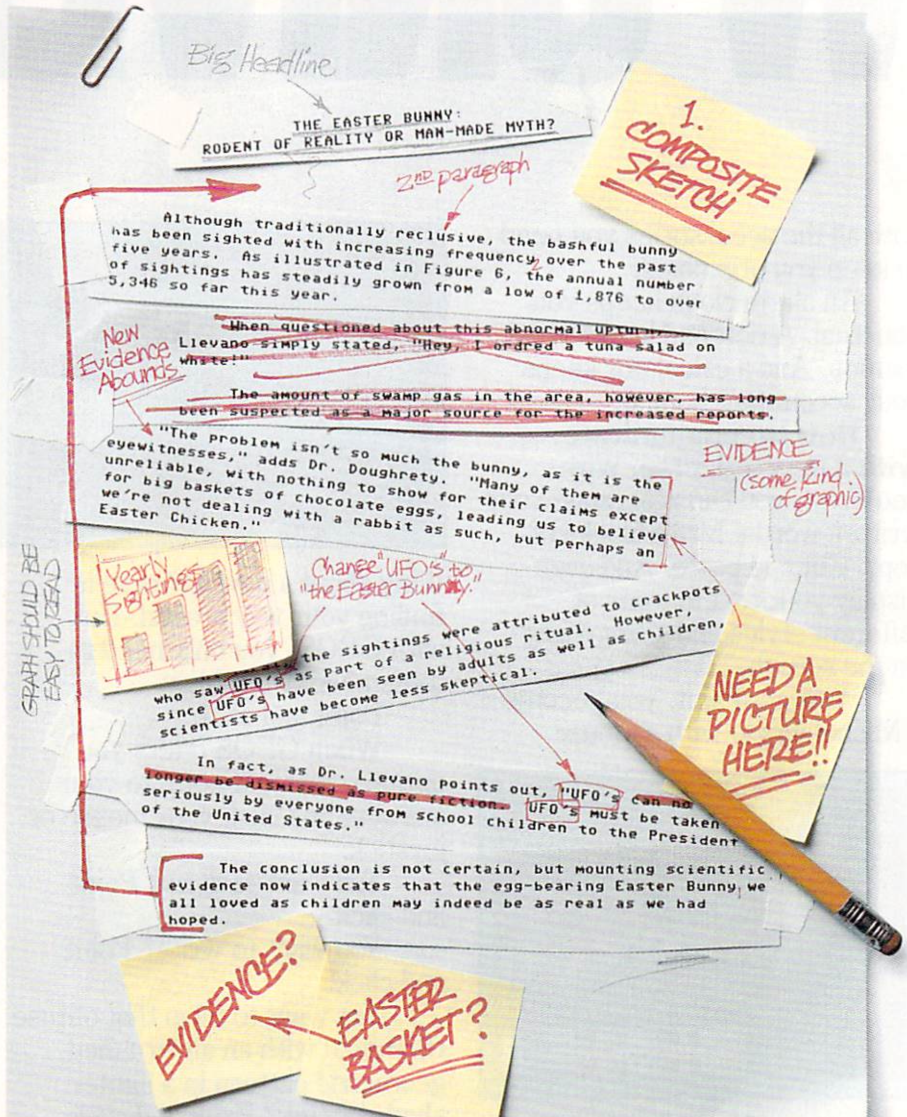
You get headers. Footers. Subscripts and superscripts. You can center your text. Right justify. Full justify. And nail



down formatting problems with variable vertical spacing and adjustable margins.

The Workshop cuts down on your manual labor, too. With one-stroke, "shortcut" keyboard commands. They keep your hands off the mouse so you can keep your mind on your work.

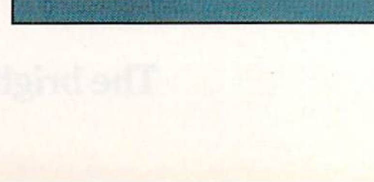
In fact, there's a complete set of heavy-duty accessories that not only strengthen your writing, but reinforce its structure, as well.



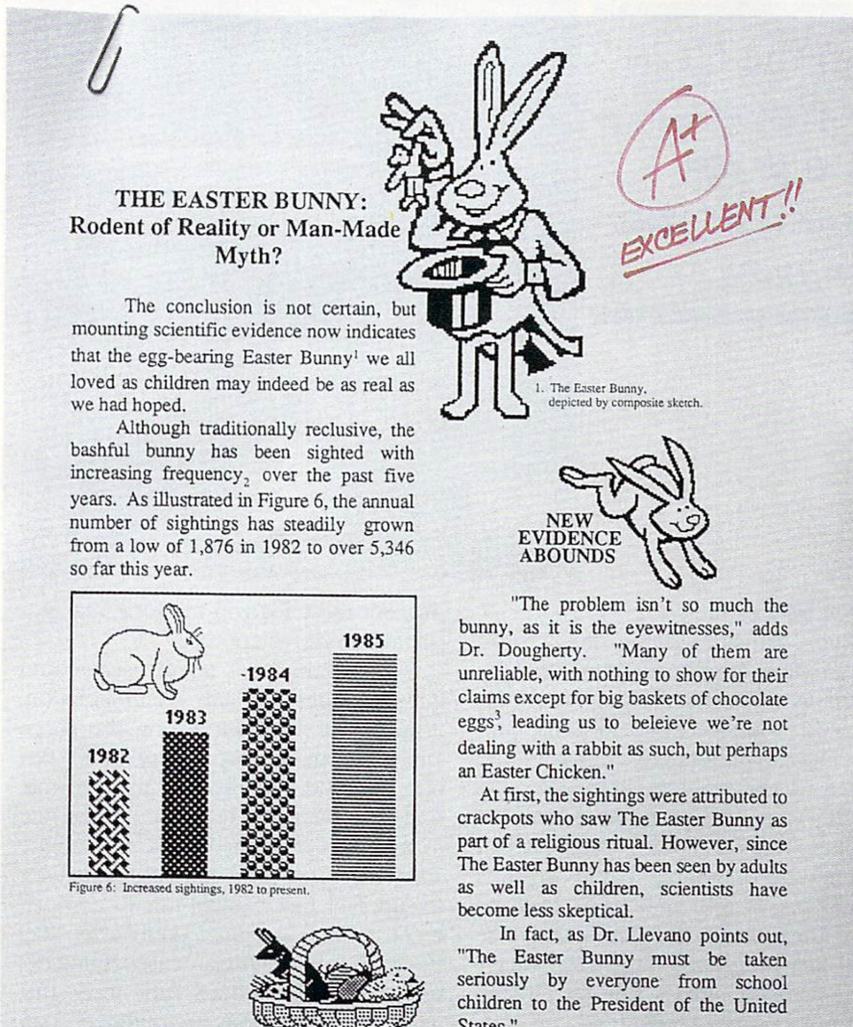
Replace old, worn-out parts. You can build anything with Writer's Workshop. And repair old stuff, too. Just decide which parts have to come out and which new ones go in.

Then hit the key and stand back.

Instantly, the "search and replace" drills through your old



GEST CASES
H A WORKSHOP.



THE EASTER BUNNY:
Rodent of Reality or Man-Made Myth?

The conclusion is not certain, but mounting scientific evidence now indicates that the egg-bearing Easter Bunny[1] we all loved as children may indeed be as real as we had hoped.

Although traditionally reclusive, the bashful bunny has been sighted with increasing frequency$_2$ over the past five years. As illustrated in Figure 6, the annual number of sightings has steadily grown from a low of 1,876 in 1982 to over 5,346 so far this year.

1. The Easter Bunny, depicted by composite sketch.

Figure 6: Increased sightings, 1982 to present.

"The problem isn't so much the bunny, as it is the eyewitnesses," adds Dr. Dougherty. "Many of them are unreliable, with nothing to show for their claims except for big baskets of chocolate eggs[3], leading us to beleieve we're not dealing with a rabbit as such, but perhaps an Easter Chicken."

At first, the sightings were attributed to crackpots who saw The Easter Bunny as part of a religious ritual. However, since The Easter Bunny has been seen by adults as well as children, scientists have become less skeptical.

In fact, as Dr. Llevano points out, "The Easter Bunny must be taken seriously by everyone from school children to the President of the United States."

Figure 4: Evidence submitted by Dr. Dougherty.

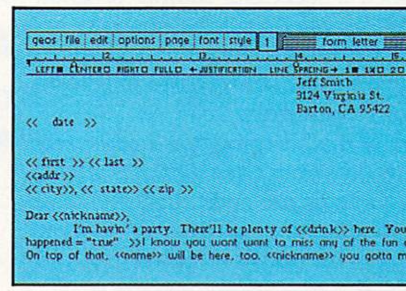
text, replacing worn-out words and phrases with your brand new ones.

For more serious cases, hand the job over to the Workshop's Text Grabber. It takes text from several word processors—like Paper Clip™—and lets you overhaul them with new GEOS fonts, formats and graphics.

A few more built-in features. Every project leaves the Workshop looking beautifully finished, too. Because it not only comes with LaserWriting compatibility, there's even a LaserWriter for you to print on.

You simply upload your files to QuantumLink.™ Then they're printed and mailed back.

Convenient, or what?



Of course, you don't want to keep good-looking documents like this to yourself. So we built in geoMerge. Which customizes your geoWrite form letters to people on your mailing lists.

So if your plans call for some real masterpieces, do something really constructive about it. Call your software dealer and requisition Writer's Workshop.

Who knows? You just might build a name for your self.

To order call 1-800-443-0100 ext. 234
Writer's Workshop $49.95
(California residents add 6.5% sales tax.)
$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

WRITER'S WORKSHOP

GEOS COMPATIBLE



Berkeley Softworks

The brightest minds are working at Berkeley.

REVIEWED BY ERVIN BOBO

I Am the C128

Computer: Commodore 128
Publisher: Activision
2350 Bayshore Frontage Road
Mountain View, CA 94043
Medium: Book/Disk
Price: $34.95

A few years ago, Creative Software published a successful tutorial program called *I Am the C64*. Activision later acquired Creative Software and changed the name of their new division to Personal Choice Software.

One of the first programs released by the new division is *I Am the C128,* a tutorial on how to use and program one of Commodore's newest home computers. It includes an excellent introduction to BASIC 7.0.

The tutorial is menu-driven. Categories are chapter headings which lead to a sub-menu of the topics of that chapter. This system makes it easy to resume a lesson or to reference a particular topic.

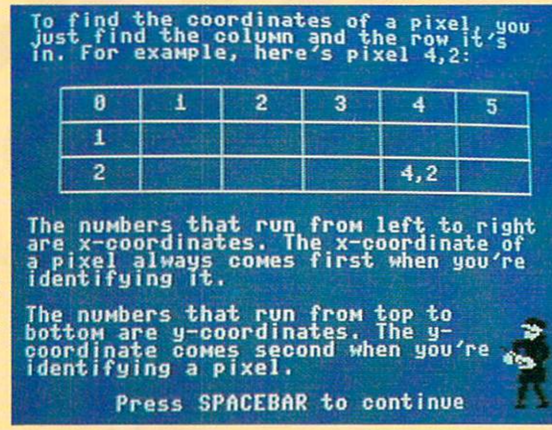
Although there are nine chapters to the volume, you may start wherever you please. If you've been using the computer for a while or if you've used other home computers, you'll probably want to skip the introduction. If you're a beginner, though, you'll definitely want to start here. You'll also learn about the different types of software available and become familiar with the graphics and sound capabilities of the computer.

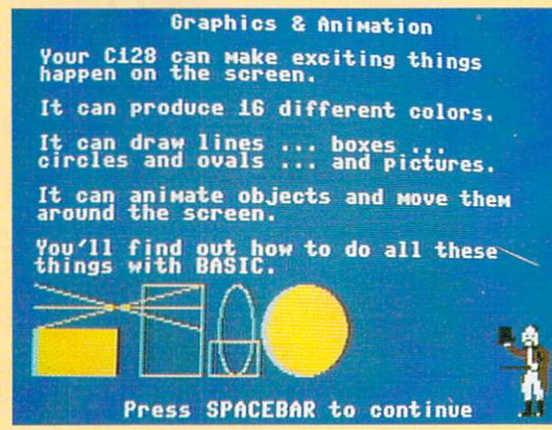
As each chapter begins, a page of information fills half the screen. The bottom part of the screen lets you pace yourself by letting you press the spacebar when you are ready to continue. The program never misses a chance to illustrate points with graphic and sound demonstrations.

Chapter two begins with actual usage of the computer, using extensive graphics displays to show you all the functions of the keyboard. From there it discusses peripherals like monitors and disk drives.

Following the two introductory chapters, there are chapters on BASIC, Advanced BASIC, Disk Usage, Screen Graphics, Sprite Graphics, Sound Effects, and Music and Programming Hints. Should you have questions on anything, returning your warranty card renders you toll-free assistance.

I Am the C128 *lets you go through the tutorial at your own pace.*





As you go through the chapters on programming, simple programs will be printed to the screen, along with text telling you what to expect from the program. When you feel you've studied the listing long enough, type RUN and press RETURN to see the program execute.

In the Screen Graphics section, you'll learn how to draw lines, circles, squares and ellipses, as well as how to fill them with color and alter their sizes. There are three other programs on the disk, one for creating graphic shapes, one for moving a sprite, and one for sound.

To load and run *I Am the C128,* turn on your disk drive, insert the disk, then turn on your computer. As with most programs made specifically for the 128, the disk is self-booting and you need do nothing else to enter the tutorial. Because of the heavy reliance on graphics, you must have your monitor in composite mode and the 40/80 column key of your 128 in the "up" position.

For the sample programs, turn on both disk drive and computer, then insert the disk. At the READY prompt, type RUN "Sprite" or RUN "Sound." Because they are free-standing programs, as opposed to those that are a part of the tutorial, they are there for you to enjoy, manipulate and improve upon.

It is possible that some users could quibble about the slim documentation. Printouts, except for listing the three sample programs, are not possible. But bear in mind that most of the information—if you need hardcopy reference material—is in your *C128 User's Guide* and that the purpose of the tutorial is not to supplant that manual but to complement it. For example, I doubt even Ray Bradbury could write an entertaining description of keyboard functions. But when those functions are outlined in an animated tutorial, you will not only be entertained but will probably retain more of what you see.

The random access feature (the ability to go to any chapter and sub-heading) does give *I Am the C128* value as a reference tool, and it should appeal to older computer users who have always wanted to dip into BASIC but never gotten around to it.

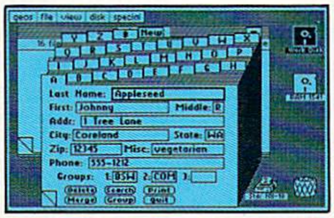
For the absolute beginner, *I Am the C128* will be invaluable. I suggest you buy a copy at the same time you purchase your computer. Then go home with the certainty that you really can learn your new 128. ▣

ARE YOU SEARCHING FOR FRIENDS?



If you're finding it increasingly difficult to find anything at all, maybe it's time you found out about geoDex. The GEOS-compatible directory that generates mailing lists. Prints address labels. And sorts out all sorts of things for your Commodore.

Try directory assistance. With a little help from geoDex, you can call up a directory organized from any three categories you choose. Which means you can list your friends by name, telephone number or almost anything else that can be assigned its own three-character code.



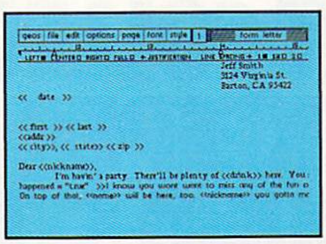
Like "MEN" for guys you know. Or "GRL" for girls you know. Or "FOX" for girls or guys you'd like to know.

But no matter how you choose to categorize them, if you can point and click a mouse, you can call up any list of friends with geoDex's easy-to-read graphics.

Our most inviting feature. Of course, once you've gotten your friends organized, the next thing we recommend you do with geoDex is really very simple.

Throw a party.

You see, geoDex comes with geoMerge, a mail merge program that customizes form letters, announcements —even party invitations—with the names and addresses stored in geoDex. First you write the letter with geoWrite. Then you select a list from geoDex.



Put them both together with geoMerge and it's toga time!

The search is over. So if you're tired of looking for friends, waltz right down to your software dealer and ask him for geoDex. We can't guarantee it'll win you more friends, but it'll certainly keep you from losing them.

To order call 1-800-443-0100 ext. 234

geoDex $39.95

(California residents add 6.5% sales tax.)

$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

Commodore is a trademark of Commodore Electronics, Ltd. GEOS, geoDex and Berkeley Softworks are tradenames of Berkeley Softworks.

GEODEX GEOS COMPATIBLE



Berkeley Softworks

The brightest minds are working at Berkeley.

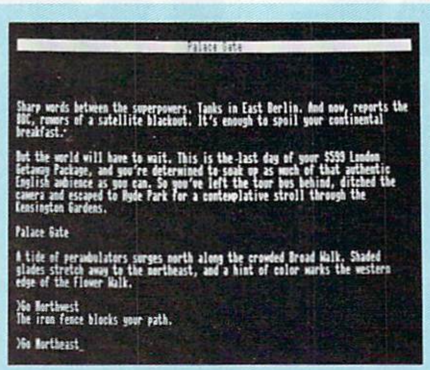
REVIEWED BY GARY V. FIELDS

Trinity

Computer: Commodore 128
Publisher: Infocom/Activision
2350 Bayshore Frontage Road
Mountain View, CA 94043
Medium: Disk
Price: $34.95

Trinity gets both its name and plot from the site of the explosion of the first nuclear device. On July 16, 1945, in a stretch of New Mexico desert known as "the journey of death," man first released the deadly power of the atom. The project's code-name was Trinity. Your mission is to journey back through time and space to that history-altering day and change man's destiny.

But before you can begin, you must unravel the mysteries of London's Kensington Garden. Afterward, you must untangle a multitude of riddles in the world beyond the garden's white door.



Journey back to July 16, 1945, to the site of the first nuclear explosion. Can you—or should you—stop it?

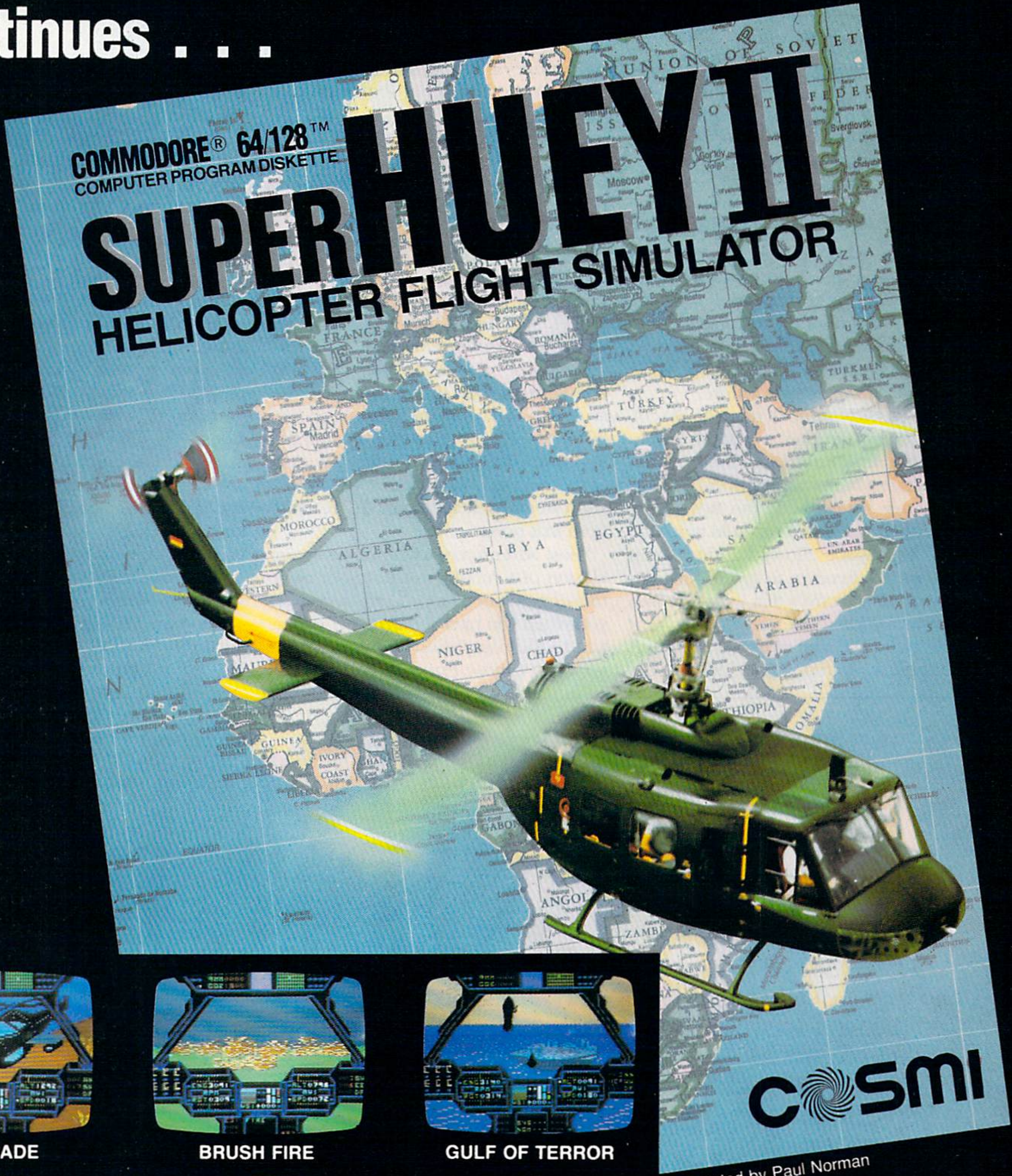
If you are familiar with other electronic adventure stories like the three *Zork*'s, you'll have no trouble maneuvering through this one. *Trinity* is an all-text thinking game and input is via the standard Infocom full-sentence parser. You are given information through sentences printed on the screen, and your typed response to those prompts influences what will happen next.

Adhering to the adage that you shouldn't fix anything that isn't broken, Infocom breaks little new ground with this interactive adventure. There are no graphics—instead, the visions you "see" are those created in your mind. And because it is designed for the Commodore 128 using an 80-column display and accesses the 1571 disk drive, conversing with *Trinity* is faster and easier than earlier electronic adventures.

The program also has an expanded vocabulary and immensely improved recognition library. It will sensibly respond to almost any command. Even improper capitalization of words doesn't confuse it. Plus, if you mistype a word in a sentence, you no longer have to retype the entire command like most other text adventures. Instead, *Trinity* will respond that it doesn't understand the mistyped word. You can then correct the word by typing

Continued on pg. 32

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Continued from pg. 30

Should you change history?

"OOPS" followed by the correctly spelled word, and *Trinity* will automatically insert the correction, reread the sentence, and respond. Anyone who has been frustrated at having to retype lengthy commands because of a single typo will appreciate this feature.

The physical value of using an 80-column display is evident as soon as you issue your first command. *Trinity*'s responses can be more descriptive and informative than 40-column novels because the large screen can hold twice the text. This space allowed author Brian Moriarty the freedom to sprinkle his narrative with adjectives that inject life into the story. The result is a novel which reads more like a piece of literature than a computer printout. This added space is also important because many of the story's passages are lengthy and would have strained the restrictions of a smaller screen.

As is true with all electronic novels, the adventurer here is free to decide what will happen next and influence the story's ending. But *Trinity* has a plus. In addition to being a great adventure game, it is filled with strange and weird wonders. Once you're beyond the white door, you'll experience a sometimes terrifying, sometimes beautiful, and other times humorous world.

For those who want to record their conversation with the program, there is an option to have all the information sent to the printer as well as screen. You can also save your point of play at any time (maximum of four different places), so you can go back and continue "reading" from that point.

Most adventurers will also like the inclusion of a running total of your accumulated points. The program also alerts you when you uncover an object important to the completion of *Trinity*. If you are one of those experienced adventurers who spurns any help, you'll be happy to know that you can turn this feature on or off. But personally, I need all the help I can get.

Trinity's commands include what have become industry standards, such as "inventory" to check what you are carrying; "look" to check the details around you; and "again" if you want to repeat your action again.

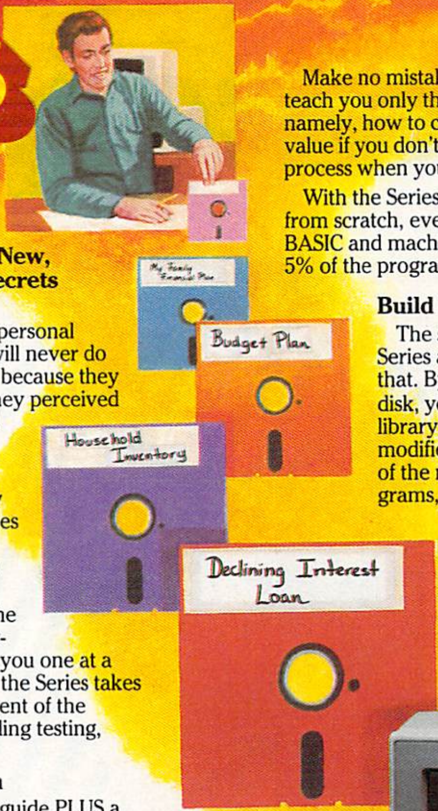
One nice feature is the ability to string commands together. For instance, if you want to go north one move, east two moves and then pick up the stone, rather than issuing four different commands, you can string them all together like this: "Walk north, walk east, walk east and get stone." Or, after you become comfortable with issuing commands, you could abbreviate the command like this: "n,e,e and get stone." But be careful with this rapid movement option. The first time I tried it, I promptly stepped off the side of a cliff to my death—I turned east when it should have been west.

Although *Trinity* will work with the 1541 disk drive, I highly recommend using the 1571 drive instead. The speed

Continued on pg. 123

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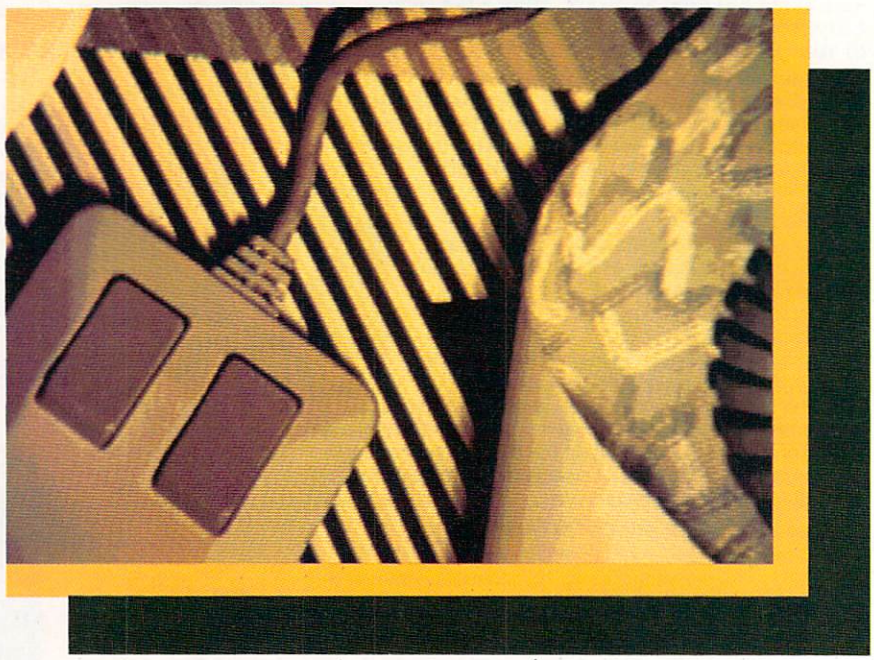
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Partner 128

Computer: Commodore 128
Publisher: Timeworks
444 Lake Cook Road
Deerfield, IL 60015
Medium: Cartridge
Price: $69.95

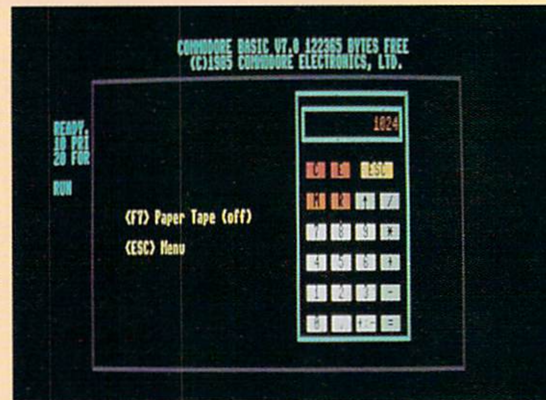
Have you ever wished you could jump out of the program you're in, use your Commodore 128 as a calculator, and then return to the original program without having to reload it? Or maybe you wanted to leave your word processor to look up an address in your data base without having to first save your document and boot another program. Well, now you can use Timeworks' *Partner 128* to stop in the middle of most 128 programs and call up desktop accessories that include an appointment calendar, memo pad, address/phone list and calculator. Then when you finish, you can return to where you left off in the original program simply by pressing the ESC key.

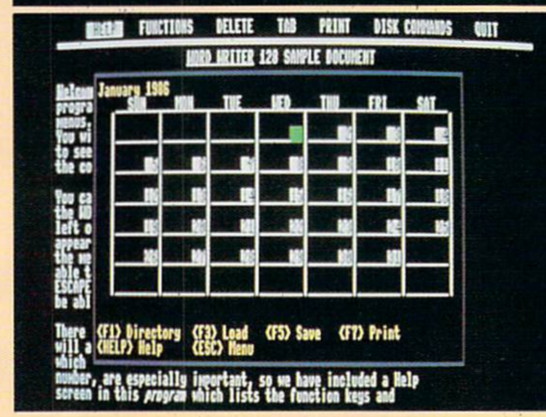
Partner 128 is a cartridge that plugs into the expansion port of your 128 and connects to controller (joystick) port 2 via a short cord. It includes a 1541 fastloader called Swiftload. To access *Partner 128*'s main menu, simply press a button on top of the cartridge. Timeworks has also included a small rubber foot that is attached to the bottom of the cartridge for support when the button is pressed.

The first item on *Partner 128*'s main menu is the appointment calendar. For those of you who like to plan things far in advance, the calendar allows you to enter appointments and other reminders for every month from January, 1986, until December, 1999. Once you select Appointment Calendar from the menu, you can either load previously saved appointments for any month, or enter new appointments and information.

Each month appears as a separate calendar page, and you can move back and forth through the calendar either one or six months at a time. Within each month, the cursor keys are used to select specific days to view current information or schedule new appointments. Days which already have information entered for them are indicated by a short title describing the day's activities.

Partner 128 *can "invisibly" co-exist with other 128 programs.*





In addition to the title, you may enter up to five key tasks, five items on a separate "to do" list, and a number of appointments along with their scheduled times. To get a printout of a day's activities, you simply select the day and press F7. All calendar information, along with other data you'll create with *Partner 128* (such as memos and address lists) must be saved on a formatted data disk before you turn off the computer.

While *Partner 128*'s memo pad may not be a full-fledged word processor, it has enough text-editing features to make entering memos, help screens and short reminders a snap. For example, you can easily move the cursor to the top of the display, the end of your text, or five spaces to the left or right. Also, characters and entire lines can be inserted or deleted with just a couple of keystrokes.

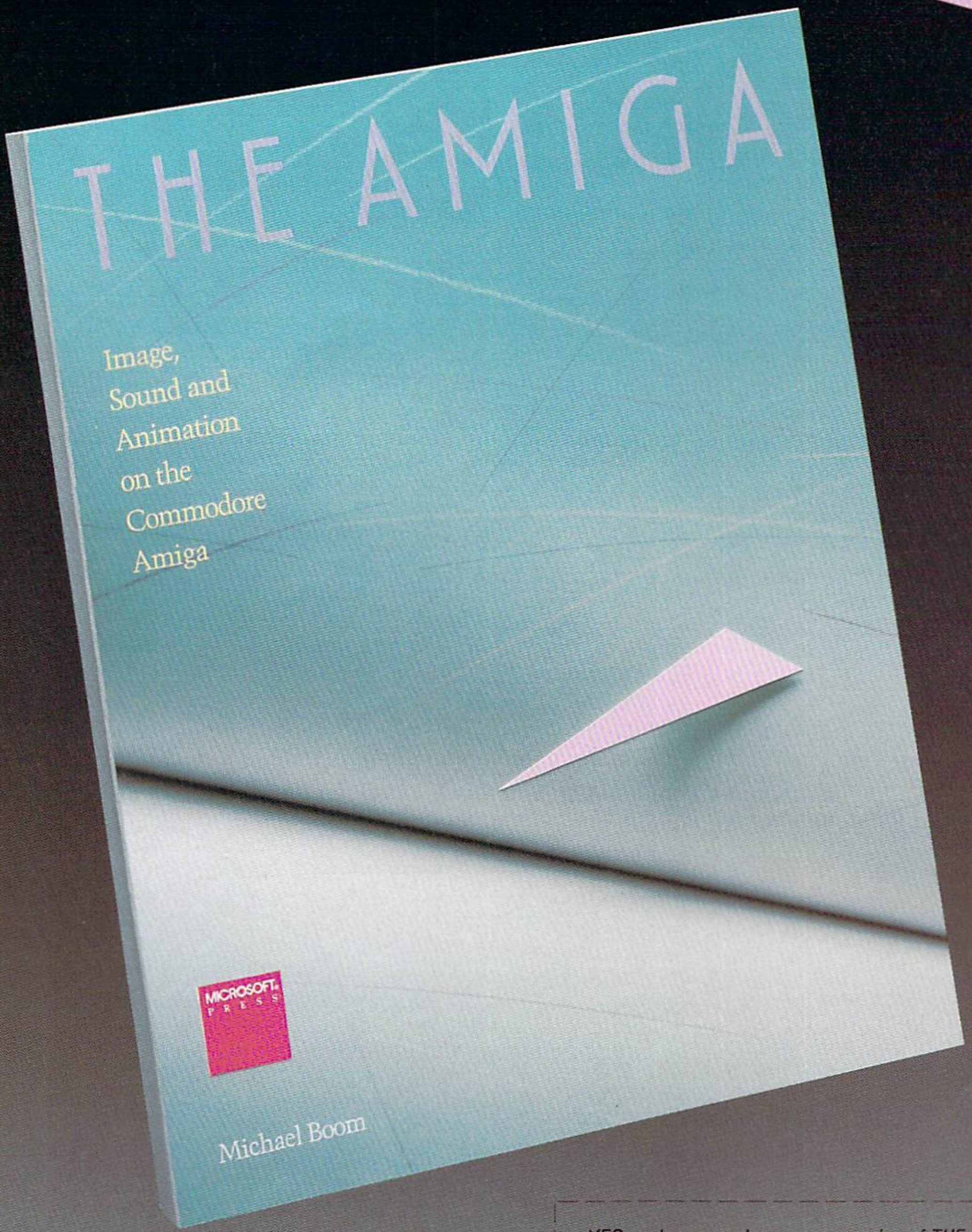
What's even more surprising is that *Partner 128*'s memo pad features automatic word-wrap, and you can even search your memos for specific words or character strings. This is particularly useful since memos can be as much as 60 columns wide by several hundred lines long. When you're done, memos can be saved onto your data disk and printed. Or, if you'd rather print as you go along, a press of the F4 key puts you in the "typewriter" mode, in which each line is printed as you type.

All of the editing features available on the memo pad can also be used with *Partner 128*'s Address/Phone list. Instead of inserting or deleting individual lines, however, the address list lets you insert or delete entire records. A single record has fields for name, address, city, state, zip code and phone number. Only around 60 records can be stored in a single file, but you may have multiple files on the same data disk.

Your address information can be sorted on any field either alphabetically or numerically (by zip code, for example). You can also print envelopes or mailing labels from your address file or use it with a word processor such as Timeworks' *Word Writer 128* to create form letters. Phone numbers in your address file can be "auto-dialed" providing you have a compatible modem. I couldn't get this feature to work with a Mitey Mo, but, according to the manual, it should work with most Commodore and Hayes-compatible modems.

Continued on pg. 122

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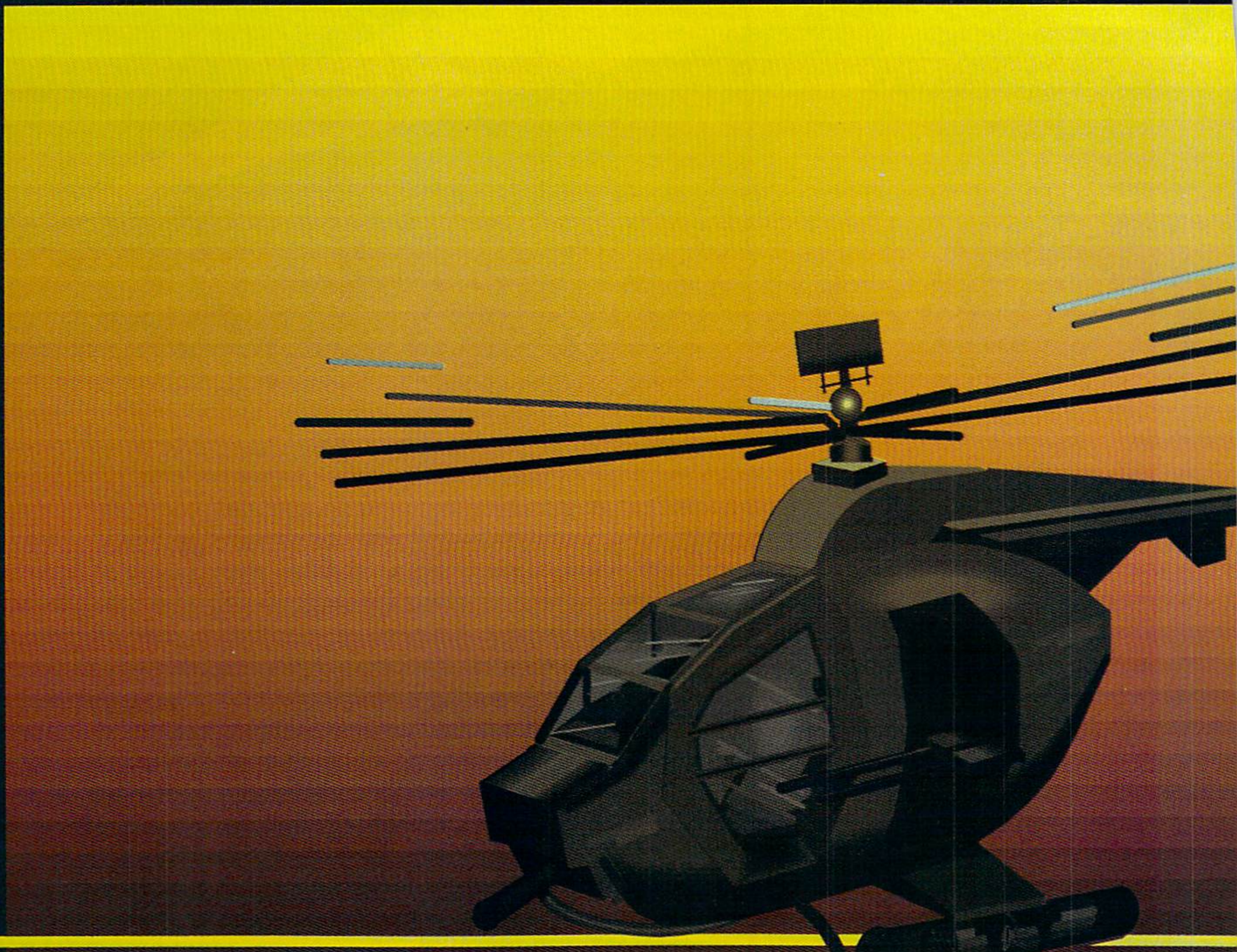
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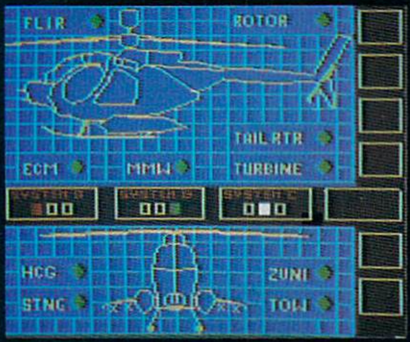
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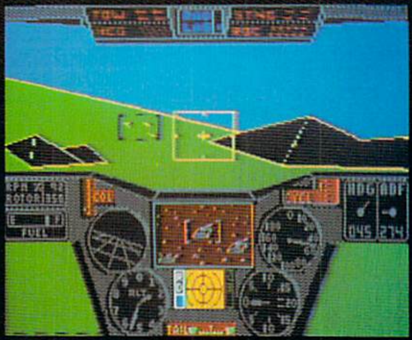


In a market full of helicopter simulations like Super Huey II, Gunship, and Infiltrator, it's nice to find a product like ThunderChopper that flies high above the rest!

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- Better program and documentation design gets you up flying exciting combat missions in minutes.



As Colonel Jack says:
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REVIEWED BY ERVIN BOBO

Whole Brain Spelling

Computer: Commodore 64
Publisher: SubLogic
713 Edgebrook Drive
Champaign, IL 61820
Medium: Disk
Price: Not available

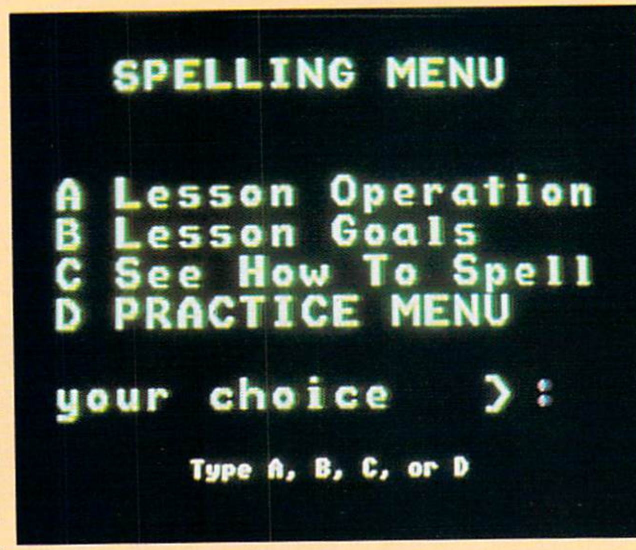
SubLogic's *Whole Brain Spelling* was not designed to teach your child to spell the 2,000 words contained in its ten-word lists, though, that is certainly a desirable by-product. Rather, it was designed to teach HOW to spell: to reinforce the visualization of words and to teach the method of knowing when a word "looks" right. Current educational theories and research shows that the best spellers are those who internally visualize a word to see whether it looks correct.

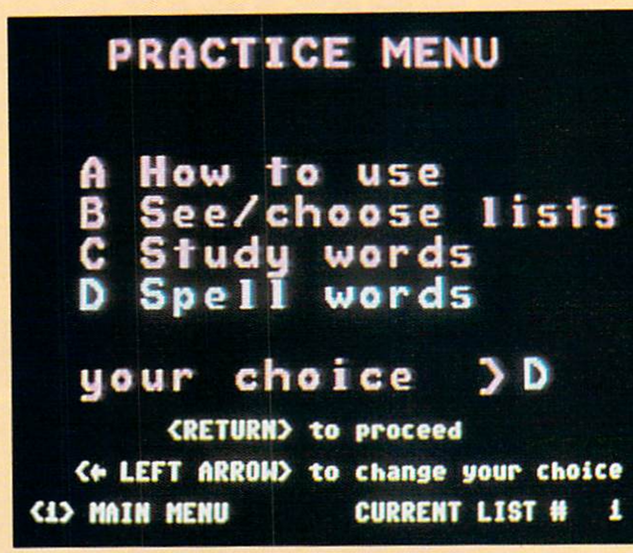
In use, *Whole Brain Spelling* was designed for ages five through twelve. As progress is made through the word lists, the difficulty of the words increases. The lists concentrate on many words that do not look the way they sound, such as though, bough, rough, thought and thaw.

From a main menu, the child chooses Lesson Operation, Lesson Goals, See How to Spell or Practice Menu. The choice, made by pressing a single letter and RETURN, will lead to a sub-menu. From here the child can choose to study a word list before attempting to spell them. Here the words are presented one at a time and may be kept on-screen for as long as desired. The concept here, again, is to SEE how the word LOOKS.

In the spelling section, the target word is surrounded by a border and is on the screen for only a few seconds. Once it has disappeared—having given the child time to SEE it but not necessarily SPELL it—the child must spell it. A correct answer results in a rippling color effect through the word, with an invitation to try it again. An incorrect answer—say the word was "false" and the child spelled it "filse"—results in the word reappearing within the border, spelled correctly, with the area of the mistake highlighted in a different color. In our example, the a would be highlighted.

This one is easy enough for an unattended child to use.



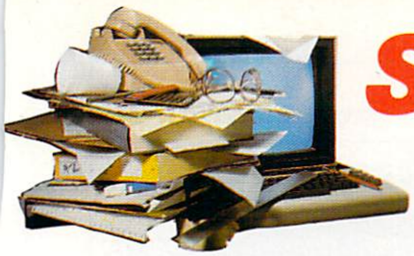


By showing the word only in its correct form, but with the area of the mistake indicated, *Whole Brain Spelling* is again reinforcing the concept of seeing and visualizing correctly. Once the child has corrected the word, he or she is invited to spell it again before going on to the next word.

No scores are kept in *Whole Brain Spelling*, for that is not the object. The documentation itself has an introduction that should interest the parent. The balance of the documentation should be understandable by a child of about nine with average reading skills. The workings of the program itself, however, should be understandable to even younger children.

Whole Brain Spelling is not intended as a comprehensive spelling curriculum, nor is it to be thought of as a substitute for other spelling activities. So far, these activities are best left as a part of the classroom experience. *Whole Brain Spelling* should be thought of as a supplement. Given the aims of the program, I think it succeeds. It is not as flashy as some other spelling programs, and in fact, compared to such programs, *Whole Brain Spelling* seems rather austere.

The difference is that this one is easy enough for an unattended child to use, and the concepts behind it are grounded in solid educational theories. As an addition to the conventional learning process, I consider *Whole Brain Spelling* to be a worthwhile tool. C



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REVIEWED BY SCOTT A. MAY

Great British Software

Computer: Commodore 64
Publisher: Mindscape
3444 Dundee Road
Northbrook, IL 60062
Medium: Disk
Price: $14.95

Diehard fans of multi-screen arcade games will be pleased to find that it is thriving in the minds of British designers.



Consider this collection of three games, subtitled *Great British Software,* a sort of a message in a bottle from our English cousins across the Atlantic. Uncork the bottle and discover worlds of non-stop action, mystery and off-the-wall humor. It is a rare glimpse into the British software scene that no dedicated American gamer should pass up.

Multi-screen arcade games, long the staple of America's home computer diet, have all but disappeared in recent years. Diehard fans of this faded genre will be pleased to find it thriving in the minds of British designers. The British like their arcade games fast, big and very difficult.

Another trademark of British software is the documentation, or rather, the lack of it. What is an inconvenience to American eyes is accepted in England. Indeed, much of the challenge lies not in playing the game well, but learning how to play the game at all. These qualities evoke a style and charm that is distinctively British.

The first game in this collection is a one-player contest called *Brian Bloodaxe.* What sounds like a game for mad slashers is really quite upbeat. It is the story of a crazy Nordic warrior named Brian who, for lack of anything else to do, decides to invade the United Kingdom, steal the Crown Jewels, and sit triumphantly on the throne. Standing between Brian and his peculiar goal are 104 screens of danger, puzzles and pure insanity.

Using a simple combination of keyboard and joystick commands, players must run and jump Brian through a wide variety of interconnected "rooms." On constant patrol in each room is perhaps the oddest mixture of computer antagonists ever assembled in a single game: rampaging rhinos, mummies, coal miners, chomping scissors, stomping boots and dancing penguins. And that's just on dry land. Some screens contain water obstacles filled with sea serpents, ducks, battleships and sharks. Keep searching and you're bound to find the kitchen sink in there somewhere.

Weapons, tools and other bounty litter each screen, but Brian can only hold three items in his inventory at one time. Although most objects are clearly defined, the value and purpose of some items must be determined through old-fashioned trial and error. Points are awarded for picking up treasures, eliminating obstacles and solving puzzles.

Players are limited to only three lives with which to complete the quest, so extreme caution should be exercised at all times. Encounters with most on-screen perils or falling too far from a ledge will result in the loss of a life. Take each death in stride and learn from your mistakes.

Overall, *Brian Bloodaxe* is a lively strategic contest for players who yearn for something off-beat and challenging.

The next game, *Revelation,* is like stepping back in time to the early days of videogames, where plot and character development took a back seat to fast and furious action.

The rather thin storyline involves the search for the Monster of the Apocalypse, an obscure enemy that threatens to destroy the world and lay waste to humanity. This one-player quest takes you through 40 creature-filled caverns of increasing difficulty before facing off against the monster itself.

Scattered throughout each multi-level cave are five Demon Towers used by the Monster to produce new creatures from bubbling lava pits on the cavern floor. As one creature is destroyed, another immediately takes its place. To stop this regeneration, you must knock out all five towers. Only when the last tower falls can you destroy the remaining enemies and advance to the next cavern. *Revelation* features over 400 screens and 31 different creatures.

Riding atop a majestic eagle, the on-screen hero is similar to the one in the arcade game *Joust.* Armed only with a lance that spews forth a stream of energy blasts, players must maneuver their bird to each tower while under constant attack. The landscape is beautiful—360-degree scrolling terrain rendered in reds and yellows.

Although *Revelation* suffers from a problem common to most early videogames—repetition—its excellent graphics and challenging game play should keep even the most jaded joystick jockeys glued to the screen.

Quo Vadis, the final game in this collection, is easily worth the price of admission alone. Released in 1984, *Quo Vadis* climbed to the top of the British charts and has since become one of England's best known software exports.

On the surface, this single-player game looks like just another running/jumping

Continued on pg. 122

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REVIEWED BY DAVID R. BROOKS

The Advanced Music System

Computer: Commodore 64
Publisher: Firebird Software
71 North Franklin
Turnpike
Waldwick, NJ 07463
Medium: Disk
Price: $79.95

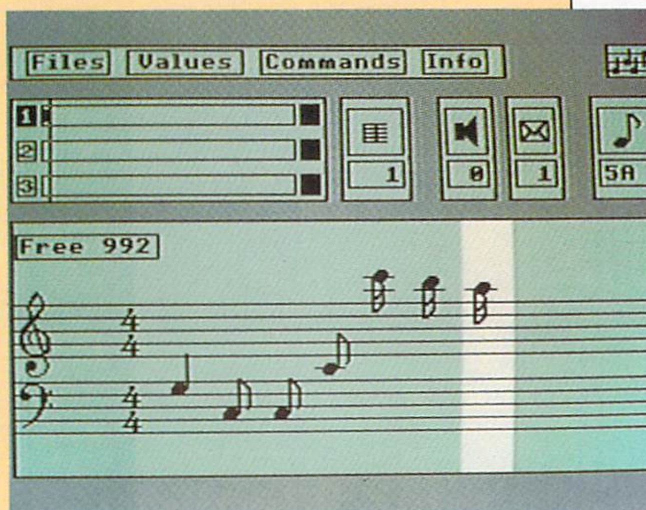
The *Advanced Music System* from Firebird Software is an innovative music composition and editing system for the Commodore 64 that accesses the 64's SID chip with an external musical instrument digital interface (MIDI)-compatible keyboard. An earlier, simpler and less expensive version with no MIDI capability, *The Music System,* is also available. However, the advantages of the MIDI-compatible *Advanced Music System* are so substantial that I see no reason for getting the simpler version unless the price is an overruling consideration.

It's significant to note that although this program is new to the United States, it has already been thoroughly tested in Britain. The earlier version first caught my eye with some favorable reviews in British personal computer magazines. It was originally developed in Britain by Island Logic. Through connections with a sister company, Island Records, parts of this program have been used on at least one recording.

There is a significant advantage to including some MIDI capability in a 64 music program. With a relatively small initial investment, you can get started in the fascinating world of computer-controlled music using only this program and the internal resources of the SID chip. Later, you can buy a MIDI interface and a MIDI-compatible keyboard which will provide you with much higher quality sound and six separate voices instead of just three.

Ultimately, if you want to get seriously into MIDI-based music, you will need some software designed specifically for controlling MIDI instruments. However, the work you will have put into creating music with *Advanced Music System* need not be wasted. You can borrow another 64, play your MIDI files through *Advanced Music System,* and record them with your new software.

The Advanced Music System *would be a bargain even without the MIDI features that set it apart from other 64 music composing programs.*



The initial impression made by this program is outstanding. Its graphic presentation is well thought out and visually appealing. A set of icons controls the main program flow between six main modules. Each module includes its own screen display and a series of pop-up menus that are selected with the function keys. There are six modules: Editor, Linker, Synthesiser (this spelling and a few other word choices in the manual are occasional reminders that this is a British program), Printer, Keyboard and MIDI.

The code for each module is loaded as requested from the main menu. No disk swaps are required to access all the features. The substantial amount of time required to load new modules is determined by the characteristics of the 1541 disk drive and is not a fault of the software. The program is laid out so that you don't often need to switch back and forth between one module and another. As for the icons, my personal preference is mostly for word-driven menus, but it doesn't really matter much after you become familiar with the program's operation.

My particular interest in this program is its MIDI compatibility, so that's where I've spent the most time poking around. The link between these two different worlds of computer-controlled music is important, because I think anyone who takes the time to become thoroughly familiar with *Advanced Music System* is quite likely to go on to the increased sophistication offered by MIDI hardware and software. I should point out that MIDI compatibility is an afterthought to the original structure of *The Music System* program, so the MIDI features and limitations in *Advanced Music System* must be considered with that in mind.

The basic idea is that music can be created and stored either as SID- or MIDI-compatible files which can then be transformed from one format to the other. (MIDI and SID files cannot coexist at the same time.) On the plus side, MIDI files converted to SID format can be edited in conventional music notation; this is a capability that is still hard to find in dedicated MIDI sequencers. On the negative side, some common features of MIDI-sequencing programs are lacking either because they simply have no counterpart in the world of SID music or because they lie outside the limited goals of MIDI implementation in this program.

The MIDI input mode allows you to build a composition of up to six parts by recording one monophonic track of note on/off information at a time from a MIDI keyboard. During the recording process,

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you can keep the tracks synchronized by listening to an internally-generated metronome click and one or more previously recorded tracks; this is what is generally called an overdubbing capability. There are other entry modes for SID music files from the Keyboard module of the program, but a real piano-style keyboard is usually the most efficient way to enter conventional music. Note that only MIDI-compatible keyboards will work; this does not include any of the non-MIDI plug-in keyboards that are available for the 64.

Advanced Music System will store about 3,000 MIDI events. Each note takes two MIDI events—one to turn the note on and one to turn it off—so this translates into about 1,500 notes.

It's at this point that the most significant limitation in the MIDI implementation becomes apparent: It can record and play back MIDI information on only one channel. To understand what this means, consider the popular and inexpensive Casio CZ101 MIDI-compatible keyboard. It can be programmed to play four separate parts on four separate MIDI channels, each with its own sound. This works basically like the SID chip, which can play three different voices simultaneously. However, with the *Advanced Music System,* all MIDI voices will sound the same because all information is being sent to the keyboard on the same channel. (The CZ keyboards receive all MIDI information on a single channel as a default condition and must be specifically set to operate in the "mono" mode and receive information from different channels.)

If you are interested in the program primarily for making music with the 64's SID chip, this discussion of the finer points of the MIDI implementation shouldn't concern you at all; it's not even necessarily a problem for a wide range of MIDI-based musical styles. However, I've gone into some detail on this point because the manual is unclear about MIDI implementation and because I hope this will give the more experienced computer-oriented musician a good idea of where the program lies in the range of music software.

The program also allows you to use the computer keyboard as an entry device in the Keyboard module. Inexpensive "toy keyboard" overlays for the 64 were popular a couple of years ago, and

With a relatively small initial investment, you can get started in the world of computer-controlled music using only this program and the internal resources of the SID chip.

they should work if you have one.

The program plays the notes as you press the keys and also displays them in what is called the Voice Monitor Window (VMW). The VMW is an impressive piece of programming in itself, as it decides in real time how the note you're playing corresponds to the rhythmic context you've established. Just as with input from the MIDI module, you can synchronize a new track to existing ones by listening to an internally-generated metronome click or one or more previously recorded tracks.

When you get ready to edit music files, you may find that the program has inserted lots of rests that you really don't want. For example, a quarter note may turn out to look like a dotted eighth note plus a sixteenth note rest because you didn't hold the key down for the entire quarter note; this is a result of the musical style of the piece you are playing, and you may or may not want the effect to appear in a printed music score. The program has an editing feature called "block tidy" that attempts to remove extra rests by changing some of the note values. With this feature and some of the other editing commands, it's possible to create a music file that is not so cluttered with extraneous rests.

You will find that the Editor module provides just about any editing function you can think of for SID-based music. Frankly, this kind of capability takes a lot of getting used to. There really isn't any way to make music editing as intuitive on a computer keyboard as, say, word processing. This is one place where I definitely feel that fancy graphics get in the way. On-screen listings of the most commonly used commands, for example, would minimize the number of commands that have to be remembered or (even more time-consuming) looked up in the manual.

No separate help screens are available. However, there is a separate reference sheet with a listing of all commands. Keep it with you always! As with all sophisticated programs, a learning process is required to obtain sophisticated results.

The Editor scores music in a completely standard way, with time and key signatures, barlines, repeat signs and the accepted conventions governing the interpretation of accidentals. In addition, you can insert what the program calls loop sections that can be repeated indefinitely during playback; these are useful for repeated rhythm tracks and bass lines, for example.

Advanced Music System allows editing commands to be applied to a section of notes, rather than one note at a time, by establishing "markers" within the score. These temporary limits are defined with a single key stroke and may easily be moved as required during the editing process.

A very helpful feature of the Editor is its music "notepad," where you can store sections of music for later use. The contents of the notepad can also be saved as a separate music file.

From within the Editor, it is possible to assign one of 15 different SID sounds to the part you are editing. You can reassign the envelope for each note in the part, if desired. Sound envelopes can be the preset ones on the disk, or they can be created from scratch with the Synthesiser module and saved as separate sound files.

The Synthesiser is a versatile software tool for accessing the waveforms and filters available on the SID chip. This facility includes another impressive piece of programming called a Dynamic Response Envelope. There are two of these for controlling certain SID parameters in real time without using one of the SID chip voices as modulator. You can sweep the pitch, pulsewidth or filter frequency while a note sounds to create a variety of effects like tremolo or vibrato. The effects of the Direct Response Envelopes, if any, are stored as part of the sound envelope definition.

If you are working with music files that will be played in MIDI format, you will want to make some attempt to relate the SID sounds to what your MIDI keyboard

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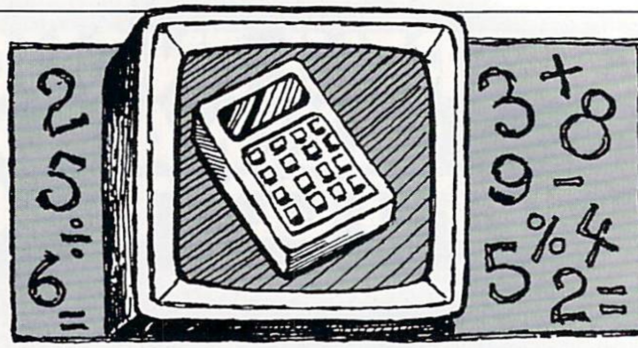
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BY MARC P. LIPMAN

Visi-Calculator

for the Commodore 64



Here is a calculator as close as your Commodore 64.

Did you ever sit down to use your calculator and find your batteries dead? Well, don't despair—here's a calculator that is as close as your Commodore 64.

It looks and acts like a hand calculator. It has ten-digit accuracy and can calculate in decimal, hexadecimal or octal. It can perform logical ANDs, ORs and NOTs, and it can print as it calculates.

The calculator is on in decimal mode with print off when you load and run the program. Most calculations can be performed simply by pressing the appropriate keys on the keyboard. If you press an illegal key, Visi-Calculator beeps.

It has a memory register, which means that you can clear a number, add and subtract the displayed number to it, multiply it by the displayed number, divide it by the displayed number, and then recall its value. These operations are performed by pressing M followed by the desired operation (c,+,-,*,/,r). All operations except MR change the contents of the memory register.

Press the control key and C to clear the entry, the accumulator and the memory register. Press Control E to clear the entry register.

Visi-Calculator will perform its operations in decimal mode (default), octal mode or hexadecimal mode. Modes are switched by pressing the control key plus the desired key (D,O or H). The current mode is displayed on the calculator.

Whole numbers and decimal fractions may be used in decimal mode. Numbers are converted to integers when converting numbers to hexadecimal or octal. Fractions are not allowed in hexadecimal or octal. Negative numbers in hexadecimal or octal are represented in 2's complement.

To print your calculations, simply press P key. The numbers and operators will be printed. Numbers are right-justified for clarity. The printer switch on the top of your calculator will change to on. To turn the printer off, press the P key again.

F1 displays a help menu. Press the space bar for the next help menu. Press F1 again to return to calculator mode.

Visi-Calculator can be switched to visible mode by pressing the V key. The contents of the accumulator, entry register, memory register and the last operation will be displayed on the right (in decimal). However, this will slow Visi-Calculator slightly. Press V again to switch off visible mode.

Visi-Calculator is written entirely in BASIC and uses BASIC's arithmetic operators. It will handle decimal numbers between 2.93873588E−39 and 1.70141183E+38. Numbers smaller than .01 or larger than 999,999,999 will be printed in scientific notation.

Operands for ANDs, ORs or NOTs must be integers between −32,768 and +32,767. If the operands are not between this range, Visi-Calculator will beep and the operation will not be performed. ■

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Visi-Calculator

```
10 PRINT"[CLEAR]";:GOSUB 1000
   :GOTO 1300'DLSB
20 T$="":GET T$:IF T$="" THEN 20'FKQD
24 IF T$="M" THEN GOTO 600'EFAF
25 IF CT=0 THEN E=0'EFJG
30 IF T$="=" OR T$="+" OR T$="-" OR
   T$="*" OR T$="/" THEN GOTO 500'MNMK
40 IF T$="&" OR T$="[^]
   " THEN GOTO 500'GHRF
50 IF T$<>"!" THEN 80'EEAE
60 IF CT<>0 THEN GOSUB 960:E=NOT E:X=E
   :GOSUB 700:GOTO 560'KUKM
70 GOSUB 950:AC=NOT AC:X=AC:GOSUB 700
   :GOTO 560'GUYL
80 IF T$="V"GOTO 850'DFYH
85 IF T$="."AND BS$="9" THEN PT$="Y"
   :GOTO 160'HMNR
90 IF T$>="0"AND T$<= "9" AND
   PT$<>"Y"THEN E=BS*E+VAL(T$)
   :GOTO 160'PTVU
95 IF T$>="0"AND T$<= BS$AND
   PT$="Y"THEN E=E+VAL(T$)/XX:XX=XX*BS
   :GOTO 160'QEOD
97 IF T$=CHR$(8) THEN BS=16:BS$="F"
   :PRINT "[HOME,DOWN2]"TAB(15) "(H)"
   :GOTO 200'JVMX
98 IF T$=CHR$(4) THEN BS=10:BS$="9"
   :PRINT"[HOME,DOWN2]"TAB(15)"(D)"
   :GOTO 200'JVKY
99 IF T$=CHR$(15) THEN BS=8:BS$="7"
   :PRINT "[HOME,DOWN2]"TAB(15)"(O)"
   :GOTO 200'JVDA
100 IF T$="P" THEN GOTO 900'EFGX
110 IF T$>="A"AND T$<="F"AND
    BS$="F"THEN E=BS*E+ASC(T$)-ASC
    ("7"):GOTO 160'QVPM
120 IF T$=CHR$(133)THEN GOSUB 20000
    :GOTO 10'GPXD
130 IF T$=CHR$(3) THEN AC=0:OP$=" "
```

```
    :PO$=OP$:GOTO 150'IXQI
140 IF T$=CHR$(5) THEN GOTO 150'FIYD
141 IF T$="&"THEN GOTO 500'EFKD
145 GOSUB 10000:GOTO 20'CIMG
150 E=0:PT$="":XX=BS:X=E:GOSUB 700
    :GOTO 560'GWFJ
160 X=E:CT=CT+1:GOSUB 700
    :GOTO 560'FQAI
200 XX=BS:IF CT<>0 THEN T=E:GOSUB 1600
    :E=T:GOSUB 700:GOTO 560'KBRI
210 T=AC:GOSUB 1600:AC=T:GOSUB 700
    :GOTO 560'FUBE
500 IF OP$="+"THEN AC=AC+E'FIXE
510 IF OP$="-"THEN AC=AC-E'FIBF
520 IF OP$="*"THEN AC=AC*E'FIYG
530 IF OP$="/"THEN AC=AC/E'FIFH
540 IF OP$=" "THEN AC=E'EGPH
544 IF OP$="[^]"THEN GOSUB 950
    :AC=AC OR E'GMAO
545 IF OP$="&"THEN GOSUB 950
    :AC=AC AND E'GMYO
546 IF PF$<>"Y" THEN GOTO 550'FGEN
547 ST$=STR$(E):GOSUB 1500
    :PRINT#4,OP$ LEFT$(SP$,I);ST$'FDET
548 IF T$="=" THEN ST$=STR$(AC)
    :GOSUB 1500:PRINT#4,"=" LEFT$(SP$,
    I);ST$'IDIX
550 OP$=T$'BFLF
555 PT$="":XX=BS:X=AC:GOSUB 700:CT=0
    :'FVOR
560 PRINT "[RED,HOME,DOWN4,RIGHT2,RVS]
    ";LEFT$(SP$,15-LEN(ST$));ST$;"
    [RVOFF]"'ETXN
561 R=0:C=22:GOSUB 800:PRINT"VISI-CAL
    CULATOR":IF V=0 THEN 20'HQUS
562 R=1:C=22:GOSUB 800:PRINT"AC=" "
    [SPACE15,LEFT15]";AC'EOIY
563 R=2:C=22:GOSUB 800:PRINT"E =" "
    [SPACE15,LEFT15]";E'ENOA
564 R=3:C=22:GOSUB 800:PRINT"M =" "
    [SPACE15,LEFT15]";M'ENGB
565 R=4:C=22:GOSUB 800:PRINT"OP="
    OP$'EOIQ
572 GOTO 20'BCJI
600 T$="":GET T$:IF T$="" THEN
    600'FLSF
610 IF T$="R" THEN AC = M:OP$=" ":CT=0
    :X=AC:GOSUB 700:GOTO 560'JAFN
620 IF T$="+" THEN M=M+D:GOTO 560'GJGI
630 IF T$="-" THEN M=M-D:GOTO 560'GJJJ
640 IF T$="*" THEN M=M*D:GOTO 560'GJHK
650 IF T$="/" THEN M=M/D:GOTO 560'GJNL
660 IF T$="C" THEN M = 0:GOTO 560'FITL
670 GOSUB 10000:GOTO 20'CIMJ
700 REM CHANGE NUMBER (DEC,HEX,
    ETC)TO CHAR'BGTJ
705 D=X:IF BS=10 THEN ST$=STR$(X)
    :RETURN'HOUO
710 ST$=""'BDYD
716 IF X <0 THEN X=65536+X'FJEN
720 FOR I=1 TO 100'DFAF
730 T1=(X/BS - INT(X/BS))*BS+1'HPLM
740 ST$=MID$(H$,T1,1)+ST$'DPJK
750 X=INT(X/BS)'DGTJ
760 IF X=0 THEN RETURN'ECYJ
770 NEXT'BAEI
800 POKE 781,R:POKE 782,C
    :POKE 783,PEEK(783)AND 254
    :SYS 65520:RETURN'HGNM
850 IF V=0 THEN V=1:GOTO 20'FHYL
860 V=0:GOTO 10'CFQK
900 IF PF$="Y"THEN PRINT"[BLACK,RVS,
    HOME,DOWN,RIGHT9,SPACE2,SHFT Q]"
    :PF$="":CLOSE 4:GOTO 20'HMVN
910 IF PF$<>"Y"THEN PRINT"[BLACK,RVS,
    HOME,DOWN,RIGHT9,SHFT Q,SPACE2]
    "'FDHL
915 PF$="Y":OPEN 4,4:PRINT#4,
    "PRINTER ON"'DKDQ
920 GOTO 20'BCJF
950 IF AC>LP OR AC<LM THEN GOSUB 10000
    :GOTO 20'HQMQ
960 IF E>LP OR E<LM THEN GOSUB 10000
    :GOTO 20'HORQ
970 RETURN'BAQK
1000 POKE 53280,1:POKE 53281,1:'CQVW
1010 PRINT "[BLACK,RVS,SHFT U,
     SHFT *17,SHFT I]"'BAWJ
1020 PRINT "[RVS,SHFT -] PRTR ON
     [SPACE2,SHFT Q]OFF[SPACE3,SHFT -]
     "'BAAB
1025 PRINT "[RVS,SHFT -,SPACE17,
     SHFT -]"'BAJE
1030 PRINT "[RVS,SHFT -,SHFT U,
     SHFT *15,SHFT I,SHFT -]"'BAKL
1040 PRINT "[RVS,SHFT -2,SPACE15,
     SHFT -2]"'BADD
1050 PRINT "[RVS,SHFT -,SHFT J,
     SHFT *15,SHFT K,SHFT -]"'BABN
1060 PRINT "[RVS,SHFT -,SHFT U,
     SHFT *2,SHFT I,SHFT U,SHFT *,
     SHFT I,SHFT U,SHFT *,SHFT I,
     SHFT U,SHFT *,SHFT I,SHFT U,
     SHFT *2,SHFT I,SHFT -]"'BAFO
1070 PRINT "[RVS,SHFT -2]& [SHFT -2]1
     [SHFT -2]2[SHFT -2]3[SHFT -2,
     GREEN]D[RED]E[BLACK,SHFT -2]
     "'BAWN
1080 PRINT "[RVS,SHFT -,SHFT J,
     SHFT *2,SHFT K,SHFT J,SHFT *,
     SHFT K,SHFT J,SHFT *,SHFT K,
     SHFT J,SHFT *,SHFT K,SHFT J,
     SHFT *2,SHFT K,SHFT -]"'BAKQ
1090 PRINT "[RVS,SHFT -,SHFT U,
     SHFT *2,SHFT I,SHFT U,SHFT *,
     SHFT I,SHFT U,SHFT *,SHFT I,
     SHFT U,SHFT *,SHFT I,SHFT U,
     SHFT *2,SHFT I,SHFT -]"'BAFR
1100 PRINT "[RVS,SHFT -2,^] [SHFT -2]
     4[SHFT -2]5[SHFT -2]6[SHFT -2,
     GREEN]O[RED]C[BLACK,SHFT -2]
     "'BAVH
1110 PRINT "[RVS,SHFT -,SHFT J,
     SHFT *2,SHFT K,SHFT J,SHFT *,
     SHFT K,SHFT J,SHFT *,SHFT K,
     SHFT J,SHFT *,SHFT K,SHFT J,
```

```
     SHFT *2,SHFT K,SHFT -]"'BAKK
1120 PRINT "[RVS,SHFT -,SHFT U,
     SHFT *2,SHFT I,SHFT U,SHFT *,
     SHFT I,SHFT U,SHFT *,SHFT I,
     SHFT U,SHFT *,SHFT I,SHFT U,
     SHFT *2,SHFT I,SHFT -]"'BAFL
1130 PRINT "[RVS,SHFT -2]! [SHFT -2]7
     [SHFT -2]8[SHFT -2]9[SHFT -2,
     GREEN]H[RED]X[BLACK,SHFT -2]
     "'BAHK
1140 PRINT "[RVS,SHFT -,SHFT J,
     SHFT *2,SHFT K,SHFT J,SHFT *,
     SHFT K,SHFT J,SHFT *,SHFT K,
     SHFT J,SHFT *,SHFT K,SHFT J,
     SHFT *2,SHFT K,SHFT -]"'BAKN
1150 PRINT "[RVS,SHFT -,SHFT U,
     SHFT *2,SHFT I,SHFT U,SHFT *,
     SHFT I,SHFT U,SHFT *,SHFT I,
     SHFT U,SHFT *,SHFT I,SHFT U,
     SHFT *2,SHFT I,SHFT -]"'BAFO
1160 PRINT "[RVS,SHFT -2,RED]C[GREEN]
     E[BLACK,SHFT -2].[SHFT -2]Ø
     [SHFT -2]=[SHFT -2,GREEN]C[BLACK]
      [SHFT -2]"'BAZO
1170 PRINT "[RVS,SHFT -,SHFT J,
     SHFT *2,SHFT K,SHFT J,SHFT *,
     SHFT K,SHFT J,SHFT *,SHFT K,
     SHFT J,SHFT *,SHFT K,SHFT J,
     SHFT *2,SHFT K,SHFT -]"'BAKQ
1180 PRINT "[RVS,SHFT -,SPACE17,
     SHFT -]"'BAJG
1190 PRINT "[RVS,SHFT -,SPACE2,BLUE]
     [SHFT +,SPACE2,SHFT *,SPACE2,
     SHFT V,SPACE2,SHFT N] [BLACK,
     SPACE3,SHFT -]"'BAYK
1200 PRINT "[RVS,SHFT -,SPACE17,
     SHFT -]"'BAJY
1210 PRINT "[RVS,SHFT -,BLUE]
     MC MR M+ M- M* M/[BLACK,SHFT -]
     "'BAOC
1220 PRINT "[RVS,SHFT J,SHFT *17,
     SHFT K]"'BATM
1230 PRINT "[RVS,GREEN,DOWN]
     USE <CNTL> FOR GREEN KEYS - F1
     FOR HELP[BLACK,RVOFF,UP]"'BARK
1240 PRINT "[HOME,DOWN2]
     "TAB(15)"(D)"'CDBB
1250 RETURN'BAQA
1300 SP$="[SPACE20]":OP$=" "
     :PRINT "[RED]";:XX=1Ø:BS=1Ø
     :BS$="9"'GXAI
1310 LP=32767:LM=-32768
     :H$="Ø123456789ABCDEF"
     :GOTO 555'FWCI
1500 FOR I=1 TO LEN(ST$)
     :IF MID$(ST$,I,1)="." THEN I=15-I
     :RETURN'LWGK
1510 NEXT'BAEY
1520 I=15-I:RETURN'DFDD
16ØØ T=INT(T)'CEUB
161Ø X=T:RETURN'CDMC
1ØØØØ REM BEEP'BEUR
1ØØ1Ø S=54272:FOR L=S TO S+28:POKE L,Ø
      :NEXT'HRJA
1ØØ2Ø POKE S+5,1Ø:POKE S+6,Ø
      :POKE S+24,15:POKE S,34
      :POKE S+1,5Ø:POKE S+4,33'LJLB
1ØØ3Ø FOR T=1 TO 128:NEXT
      :POKE S+4,32'GMTA
1ØØ4Ø FOR L=S TO S+24:POKE L,Ø
      :RETURN'GKAB
2ØØØØ PRINT "[CLEAR,GREEN]
      " TAB(1Ø) "INSTRUCTIONS[BLUE]
      " CHR$(13)'DHLY
2ØØ1Ø PRINT"YOUR VISI-CALCULATOR CAN
      BE USED JUST"'BABD
2ØØ2Ø PRINT"LIKE A HAND CALCULATOR.
      IT CALCULATES"'BALE
2ØØ3Ø PRINT"IN DECIMAL,
       HEXIDECIMAL AND OCTAL. IT"'BAGF
2ØØ4Ø PRINT"CAN ALSO PRINT AS IT
      CALCULATES (IF YOU"'BALA
2ØØ5Ø PRINT"HAVE A PRINTER)."
      CHR$(13)'CEQD
2ØØ6Ø PRINT"THE CURRENT MODE AND
      PRINTER SWITCH IS"'BAHD
2ØØ7Ø PRINT"DISPLAYED" CHR$(13)'CEND
2ØØ75 PRINT"FOLLOWING ARE THE KEYS
      USED BY VISI-CALCULATOR:"'BACL
2ØØ8Ø PRINT"[RVS,BLACK]
      KEY" TAB(12) "USE[BLUE,RVOFF]
      " CHR$(13)'DHQA
2ØØ9Ø PRINT"[BLACK]Ø-9,A-F[BLUE,
      SPACE2]- USED TO ENTER DECIMAL,
      OCTAL"'BAVF
2ØØ95 PRINT "[SPACE5]OR HEX
      NUMBERS"'BANF
2Ø1ØØ PRINT"[BLACK]+,-,*,/[BLUE,
      SPACE3]- USED TO ENTER
      ARITHMETIC"'BACC
2Ø11Ø PRINT"[SPACE5]OPERATOR"'BAWW
2Ø12Ø PRINT"[BLACK]&,[^],![BLUE,
      SPACE4]- USED TO ENTER
      LOGICAL"'BAOD
2Ø13Ø PRINT"[SPACE5]OPERATOR (AND,OR,
      NOT)"'BAFC
2Ø14Ø PRINT"[BLACK]<CNTL>C[BLUE,
      SPACE2]- CLEAR ENTRY AND
      ACCUMULATOR"'BAEC
2Ø15Ø PRINT"[BLACK]<CNTL>E[BLUE,
      SPACE2]- CLEAR ENTRY"'BAPE
2Ø2ØØ PRINT"[RED]PRESS F1 TO RETURN,
      <SPACE> FOR MORE"'BAME
2Ø21Ø T$="":GET T$:IF T$=""THEN
      2Ø21Ø'FNIB
2Ø22Ø IF T$=CHR$(133) THEN RETURN'FHCA
2Ø225 PRINT "[CLEAR,GREEN]
      " TAB(1Ø) "INSTRUCTIONS(CONT)
      [BLUE]" CHR$(13)'DHTE
2Ø226 PRINT"[BLACK]<CNTL>D[BLUE,
      SPACE2]- DECIMAL MODE"'BAMD
2Ø23Ø PRINT"[BLACK]<CNTL>H[BLUE,
      SPACE2]- HEXIDECIMAL MODE"'BAPF
2Ø24Ø PRINT"[BLACK]<CNTL>O[BLUE,
```

JIFFIES/VISI-CALCULATOR

```
      SPACE2]- OCTAL MODE"CHR$(13)
      'CEVA
20250 PRINT"[BLACK]P[BLUE,SPACE8]
      - TURNS PRINTER ON AND OFF"'BAJC
20260 PRINT"[BLACK]<F1>[BLUE,SPACE5]
      - HELP TOGGLE"CHR$(13)'CENB
20270 PRINT"[BLACK]M+,M-[BLUE,SPACE4]
      - ADDS AND SUBTRACTS ENTRY TO"
      CHR$(13) "[SPACE3]MEMORY"'CEGJ
20280 PRINT"[BLACK]M*[BLUE,SPACE7]
      - MULTIPLIES ENTRY BY
      MEMORY"'BAQG
20285 PRINT"[SPACE3]AND ADDS TO
      MEMORY"'BAKG
20290 PRINT"[BLACK]M/[BLUE,SPACE7]
      - DIVIDES MEMORY BY ENTRY
      AND"'BAIH
20295 PRINT"[SPACE3]ADDS TO
      MEMORY"'BAUG
20310 PRINT"[BLACK]MR[BLUE,SPACE8]
      - RECALLS VALUE IN
      MEMORY"CHR$(13)'CEBB
20320 PRINT"[BLACK]V[BLUE,SPACE8]
      - VISUAL DISPLAY TOGGLE"'BALF
21000 PRINT"[RED,DOWN2]
      PRESS F1 TO RETURN"'BAEX
21010 T$="":GET T$:IF T$=""THEN
      21010'FNHA
21020 RETURN'BAQU
```

END

BY JAMES R. HOFFER

Magic Metronome

for the Commodore 64

At the beginning of a musical composition, a symbol like this frequently appears: ♩ = 84. This tells the musician the speed of the piece. An instrument called a metronome can be set to beat within a range of 40 to 208 times per minute, and each quarter note, in this example, represents one beat.

In designing Magic Metronome, the value of R in lines 390 and 440 had to be set very carefully so that the beats per minute approximated as closely as possible true metronome intervals. The R really stands for the number of "jiffies" or thousandths of a second per beat. The total number of jiffies, of course, would be 1,000 for each beat at the 60 beat-per-minute rate, but it becomes necessary to compensate for the duration of the tick itself and the time it takes the computer to run through the timing loop.

The 60 beats-per-minute was measured in two ways. First, by comparing the beat with the National Bureau of Standards continuous time broadcast on station WWV at 10 MHz shortwave. The other way was by adding TI$="000000" at the beginning of lines 390 and 430 and inserting the following temporary lines into the program.

405 PRINT"[HOME][12 SPC][12 LEFT]"TI/60

Use your Commodore 64 as a metronome.

445 PRINT"[HOME][12 SPC][12 LEFT]"TI/60

You will soon see that due to various minute fluctuations in the computer's circuitry, it is difficult to get the reading down to exactly 1, but it is close enough for all practical purposes.

Other values of R were calculated mathematically, dividing 60 by the number of beats per minute (X value). Then the corresponding R value was chosen by trial and error to give the proper reading, and the two values placed side by side in the data statements. At 120 beats per minute, the readout should be .5, and so on.

Here is a section-by-section description of the program.

100-220	Timing and character READ routines
230-360	Main menu screen
370-460	Timing and sound loop
470-600	GET routine, including increment formulas and note shape changes
610-700	Quit routine (windowshade)
710-840	DATA statements

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

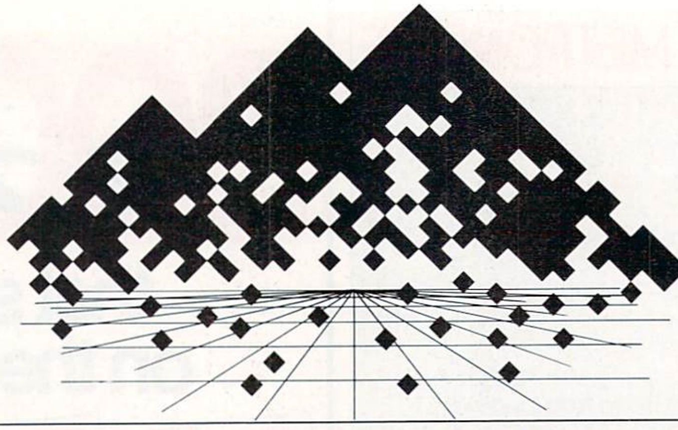
Magic Metronome

```
100 DIM X(39),R(39):S=54272'CSZA
110 POKE 53280,11:POKE 53281,12'CRMA
120 PRINT"[CLEAR,DOWN3,YELLOW]
    "SPC(7)"WELCOME TO MAGIC
    METRONOME"'CCPH
130 PRINT"[DOWN20]"SPC(18)"READING
    DATA..."'CDPE
140 FOR N=1 TO 39:READ X(N),R(N)
    :NEXT'FPHF
150 POKE 56,48'BFDB
160 POKE 56334,PEEK(56334)AND 254'DQQG
170 POKE 1,PEEK(1)AND 251'DIBF
180 FOR I=0 TO 2047:POKE I+12288,
    PEEK(53248+I):NEXT'IXRM
190 POKE 1,PEEK(1)OR 4'DGCH
200 POKE 56334,PEEK(56334)OR 1'DORA
210 POKE 53272,(PEEK(53272)AND
    240)+12'EUBD
220 FOR I=12496 TO 12543:READ A
    :POKE I,A:NEXT'GSFF
230 REM MAIN SCREEN'BKPC
240 N=11:PRINT"[CLEAR]":PRINT'DFFD
250 PRINT TAB(11)"[YELLOW]MAGIC
    [SPACE2]METRONOME"'CDCH
260 PRINT TAB(18)"[DOWN2,RVS,BROWN,
    SHFT POUND] [CMDR *]"'CDPG
270 PRINT TAB(17)"[RVS,SHFT POUND,
    SPACE3,CMDR *]"'CDAG
280 PRINT TAB(16)"[RVS,SHFT POUND,
    SPACE5,CMDR *]"'CDII
290 PRINT TAB(15)"[RVS,SHFT POUND,
    SPACE7,CMDR *]"'CDUJ
300 PRINT TAB(15)"[RVS,SPACE9]"'CDCY
310 PRINT TAB(15)"[DOWN,GRAY1,UP,
    POUND,DOWN,LEFT,BACK ARROW,SPACE3]
    = "X(N)'CHNE
320 PRINT:PRINT'CBHA
330 PRINT TAB(7)"[DOWN,GRAY1,RVS]1
    [RVOFF] = [UP][[DOWN,LEFT,^]
    "SPC(8)"[RVS]+[RVOFF]
     = INCREASE"'DELK
340 PRINT TAB(7)"[DOWN,RVS]2[RVOFF]
     = [UP,POUND,DOWN,LEFT,BACK ARROW]
    "SPC(8)"[RVS]-[RVOFF]
     = DECREASE"'DEGK
350 PRINT TAB(7)"[DOWN,RVS]3[RVOFF]
     = [UP]Z[DOWN,LEFT]]"SPC(8)"[RVS]
    Q[RVOFF] = QUIT":PRINT'EFWL
360 PRINT TAB(6)"[DOWN]
    VALUES FROM 40 TO 208 B.P.M."'CCML
370 REM TIMING AND SOUND'BODI
380 POKE S+24,15'CGOH
390 FOR T=0 TO R(N):NEXT'EHIK
400 POKE S+4,19:POKE S+5,0:POKE S+1,67
    :POKE S,15'HVLH
410 POKE S+4,18'CFRB
420 PRINT"[HOME,DOWN8]"SPC(19)"[BROWN,
    RVS,SHFT N,RVOFF]"'CDSE
430 FOR T=0 TO R(N):NEXT'EHIF
440 POKE S+4,19:POKE S+5,0:POKE S+1,67
    :POKE S,15'HVLL
```

JIFFIES/MAGIC METRONOME

```
450 POKE S+4,18'CFRF
460 PRINT"[HOME,DOWN8]"SPC(19)"[BROWN,
    RVS,SHFT M,RVOFF]"'CDRI
470 REM INCREMENT SELECTION'BSRK
480 GET F$:IF F$=""THEN 390'EIVK
490 IF F$="+"THEN N=N+1'FFML
500 IF F$="-"THEN N=N-1'FFPD
510 IF N<1 THEN N=1'EEXD
520 IF N>39 THEN N=39'EGJF
530 REM NOTE SHAPE SELECTION'BSTH
540 IF F$="1"THEN PRINT"[HOME,DOWN11]
    "TAB(15)"[GRAY1,UP][[DOWN,LEFT,^]
    "'FFWK
550 IF F$="2"THEN PRINT"[HOME,DOWN11]
    "TAB(15)"[GRAY1,UP,POUND,DOWN,
    LEFT,BACK ARROW]"'FFAL
560 IF F$="3"THEN PRINT"[HOME,DOWN11]
    "TAB(15)"[GRAY1,UP]Z[DOWN,LEFT]]
    "'FFWM
570 IF F$="Q"THEN GOTO 620'EFRJ
580 IF X(N)>99 THEN PRINT"[HOME,
    DOWN11]"TAB(20)"[GRAY1]"X(N)'FNLO
590 IF X(N)<100 THEN PRINT"[HOME,
    DOWN11]"TAB(21)"[GRAY1]"X(N)'FOUP
600 GOTO 390'BDLB
610 REM QUIT--WINDOWSHADE'BREG
620 PRINT"[CLEAR,HOME]";'BBWD
630 A$="[SPACE40]"'BCXJ
640 B$="[SPACE25,RVS,YELLOW,SPACE15,
    RVOFF,SPACE19,RVS,SHFT B,RVOFF]
    "'BCKP
650 FOR A=1 TO 17'DEBH
660 PRINT"[RVS,YELLOW]"A$;:NEXT'CEPI
670 PRINT B$'BCEH
680 PRINT TAB(19)"[RVS,SHFT W,RVOFF]
    "'CDAL
690 PRINT TAB(14)"[DOWN]
    GOOD NIGHT!"'CDYN
700 POKE 646,11:END'CHBD
710 REM DATA FOR X AND R'BMNG
720 DATA 40,1444,42,1380,44,1316,46,
    1250,48,1204,50,1158,52,1110'BFYO
730 DATA 54,1076,56,1030,58,990,60,
    960,63,904,66,864'BSTM
740 DATA 69,820,72,786,76,740,80,702,
    84,670,88,630,92,600'BXQO
750 DATA 96,580,100,550,104,522,108,
    494,112,474,116,459,120,438'BECQ
760 DATA 126,414,132,390,138,370,144,
    352,152,330,160,305'BWTQ
770 DATA 168,288,176,263,184,250,192,
    238,200,228,208,220'BWTR
780 REM CUSTOM CHAR DATA--NOTE
    SHAPES'BBUQ
790 DATA 0,0,0,0,0,4,6,5'BPTN
800 DATA 0,0,0,0,0,4,4,4'BPQF
810 DATA 0,0,0,0,0,4,4,4'BPQG
820 DATA 4,4,116,252,252,252,120,
    0'BASJ
830 DATA 4,4,116,140,132,140,120,
    0'BAHK
840 DATA 4,4,116,252,252,252,120,
    0'BASL
```

END



SILICON VALLEY INSIDER

From geoDex to Shanghai

Previews of new products from the Valley—just released or in development.

BY MATTHEW LEEDS

Activision has released **Shanghai** for the Commodore 64 and Amiga, a puzzle game with roots in the ancient oriental game of Mah Jongg. The elements of the game are deceptively simple: 144 tiles in seven suits are randomly stacked in a pattern five levels high. You must remove the tiles in matching pairs until all the tiles are removed, or until no additional moves can be made. It sounds simple, but it isn't.

Activision is also releasing **Portal,** a science fiction text adventure for the Commodore 64 and Amiga, and **Championship Golf** for the Amiga.

Arrays is publishing **Mastering Amiga-DOS** and **The Complete Commodore and Amiga Sourcebook.** The **Sourcebook** will include an Amiga hardware peripheral survey.

Berkeley Softworks, developers of **GEOS,** have released **geoDex,** a file manager for the 64. It generates mail-merge information to be used with **geoWrite** 2.0, and will keep track of names, addresses and phone numbers.

Brown-Wagh has announced **Publisher,** a page-makeup program for the Amiga. It will mix text and graphics, accept multiple fonts, and is planned to support Postscript laser printers. The text portion supports justification, centering, and kerning as well as multiple columns with variable widths. Graphics can be resized and cropped. Page layouts are shown on-screen just as they will be printed. I have been promised a beta version of the program and will give you more details as soon as I've had a chance to try it out.

Also announced by Brown-Wagh is **Order,** a desktop organizer. It includes a telephone directory, scientific calculator with tape, clock with alarms and talking messages, perpetual calendar, appointment book, screen dump and sketch pad.

Cardco has given up the ghost, but Ed Lippert has risen again, this time as **C Ltd.** Their 1MByte RAM expansion for the Amiga has been selling well, and they have a host of new products in development. They include a six-slot expansion chassis, a 20 MB SCSI hard disk drive that plugs into the expansion port and passes the buss, a new RAM expansion unit, and a typesetting program with over 200 downloadable fonts that will run with the HP Laser Jet+.

Covox is putting the finishing touches on the **Speech Construction Set** for the 64. This is a menu-driven software toolbox for editing software speech recorded with the Voice Master digitizer. It uses a cut-and-paste approach to manipulate the elements of the sonic waveform, displayed on-screen in high-resolution graphics. This program should make designing custom software speech modules much easier.

Electronic Arts is putting the finishing touches on a new game for the 64, tentatively called **Museum World.** This is a graphic adventure game that takes place on the planet Zaryl, an ancient galactic museum. It is filled with exhibits of art and events from all over the galaxy. It also contains the Book of Magic, which has been stolen. You must locate it, recover it, and return it to its correct place in the museum. To do this you must explore the museum, collect clues and artifacts, and enter into the exhibits. You must also explore the lower reaches of the museum, which contain some of the best eight-bit monsters I've seen. You'll spend hours exploring.

Geodesic Publications has an interesting program called **Triclops Invasion** for the Amiga. This multi-level arcade-style adventure can be viewed as a game, an introduction to fractals and 3D graphics, or a mix of the two. The version I had a chance to play with was V1.6. This is not the final release version, which will be V2.0, which will contain a two-player mode that uses two Amigas connected via modem. The final version will also contain demos on geodesic theory. Source code in assembler and C will also be available. V1.6 is freely distributed, so check with your local user group for a copy or contact Geodesic Publications.

Infinity Software is releasing **Grand Slam,** a tennis simulation for the Amiga. It features the big four of the world Grand Prix tennis circuit: the Australian Open, the French Open, the U.S. Open, and Wimbledon. You must coordinate your game to take into account the type of racquet you use, the court surface, the weather, your style of play, and your opponent. The game includes three-dimensional graphics, digitized sounds, random weather variances, real-time scoring and protesting. You can set up a tournament using a professional draw card.

The program offers complete control over your stroke with angle, spin, speed, lob, slice and smash options. Two-player options may include a modem connection. This is Infinity's first Amiga game, and it looks like a winner.

Midnite Press is publishing **How to Get the Most out of GEOS.** This will be the first comprehensive guide to using **GEOS.** It will include chapters on using **geoWrite** and **geoPaint** with hints on how to create your documents. Utilities for importing text from other word processors, grabbing graphics from other drawing programs, translating **GEOS** files into sequential files for modem transmission, and other goodies will be available on a separate Utilities Disk. Also included in the book will be information on the **GEOS** file

Continued on pg. 58

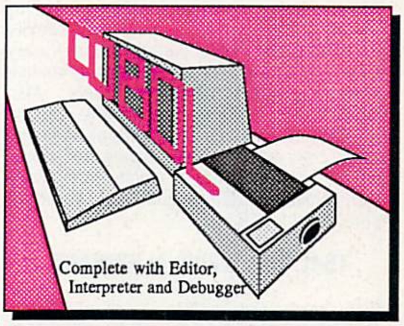
Make Your Choice

C-64 or C-128

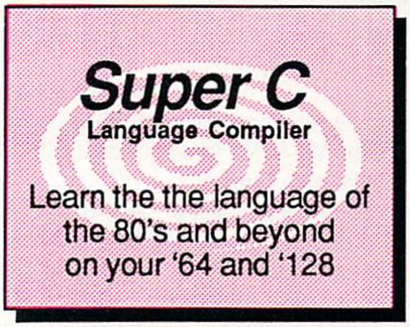
BASIC Compiler
Complete BASIC compiler and development package. Speed up your programs 5x to 35x. Compile to machine code, compact p-code or both. '128 version: 40 or 80 col. monitor output and FAST-mode operation. '128 version includes extensive 80-page programer's guide. A great package that no software library should be without. **C-64 $39.95** **C-128 $59.95**



COBOL
Now you can learn COBOL, the most widely used commercial programming language, on your 128 or 64. COBOL Compiler package comes complete with syntax-checking editor, interpreter and symbolic debugging aids. New '128 version works with 40/80 column monitors and is quicker than the '64 version. **C-64 $39.95** **C-128 $59.95**

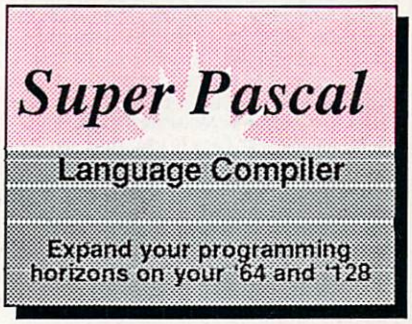


Super C Compiler
For school or software development. Learn the C language on the '64 or '128. Compiles into *fast* machine code. Added '128 features: CP/M-like operating system; 60K RAM disk. Combine M/L & C using CALL; 51K available for object code; Fast loading; Two standard I/O librarys plus math & graphic libraries. **C-64 $59.95** **C-128 $59.95**



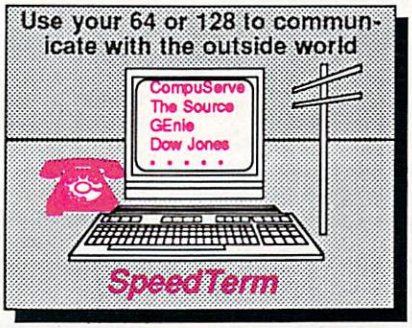
New C-128 Version!

Super Pascal Compiler
Complete system for developing applications in Pascal. Extensive editor. Standard J & W compiler. Graphics library. Added '128 features: RAM disk; 100K source/one drive or 250K/two; 80/40 column. If you want to learn Pascal or develop software using the best tool available, Super Pascal is your first choice. **C-64 $59.95** New! **C-128 $59.95**

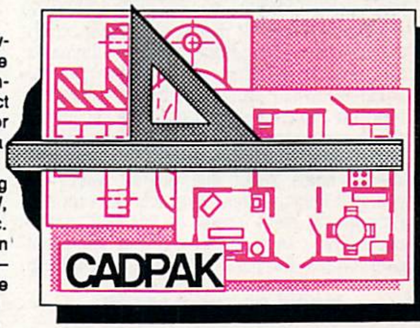


New C-64 Version!

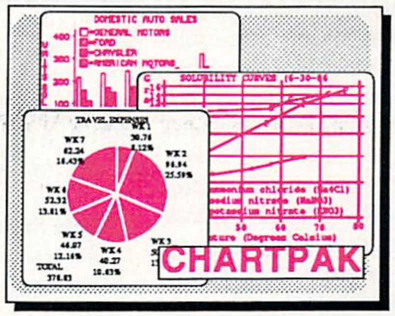
Speedterm
Let your 64 or 128 communicate with the outside world. Obtain information from various computer networks. Flexible, command driven terminal software package. Supports most modems. Xmodem and Punter transfer protocol. VT52 terminal emulation with cursor keys, large 45K capture buffer & user definable function keys. New! **C-64 $39.95** **C-128 $39.95**



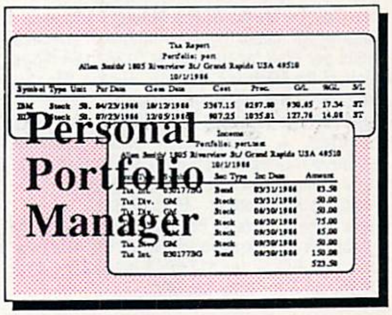
Cadpak
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SILICON VALLEY INSIDER

Continued from pg. 56

structure and memory maps of the **GEOS** operating system. Information on undocumented features is also included.

New Horizons Software is working on **ProWrite** for the Amiga. This is a multi-font, multi-color word processor that runs in 640X400 mode. I was given a very early beta version to use. It has all of the features you would expect in a standard word processor: block moves, left and right justification, headers and footers, page numbering, and search and replace. It also has some more advanced features like on-screen super and subscripts, font styling (bold, italics, underlined), and decimal tabs. The special features that make this a unique product are its ability to display any font in your font library, multi-color support, and IFF graphics display. You could think of it as **MacWrite** for the Amiga. It should be available in the first quarter of 1987.

New Horizons Software is also completing the upgrade to **Flow** for the Amiga. For those of you who are not familiar with **Flow,** it is an outline processor that lets you organize ideas and information in outline form, shuffle items around, sort and reorganize them to your heart's content. I use it to plan every column before I start to write. Check it out.

Psygnosis has produced two games for the Amiga. **Deep Space** is an arcade/strategy thriller that takes place deep in interstellar space. You are the pilot of a Strix Fighter, working as a mercenary seeking wealth and adventure. **Arena** is a sports simulation featuring six events: 100-meter run, pole vault, long and high jumps, shot-put, and javelin.

Visual Aural Animations has created the **Sound Analyzer** for the Amiga. This is a hardware device that attaches to the second mouse port. It accepts input from a built-in microphone or two RCA line level connectors that support stereo. The incoming sounds are processed into six frequency channels and two direct channels. A special ninth channel acts as a frequency counter up to 20 KHz. Five linear controls on the module affect microphone gain, left and right line gain, and bass and treble gain. The module includes a sound analysis program, a frequency counter program, and a **Visual Aurals** package.

The **Visual Aurals** package is a kinetic graphic perception program that creates infinite visual representations of sounds processed by the Sound Analyzer. The Sound Analyzer can be used to develop voice recognition or other acoustical applications.

That wraps it up for this issue. Now is a good time to remind all of you that much of what I write about is based on early looks at software still in development, so features may change by the time the products reach the shelves.

Until next month, that's all from the valley of silicon chips.

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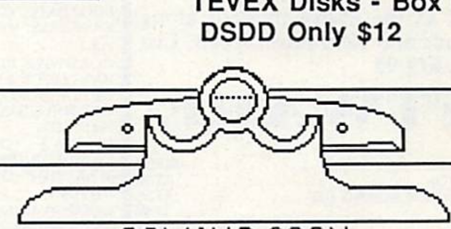
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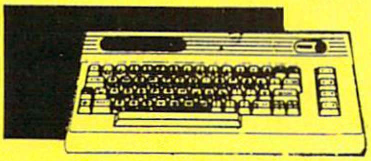
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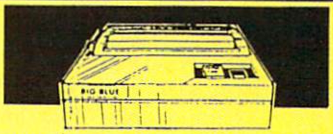
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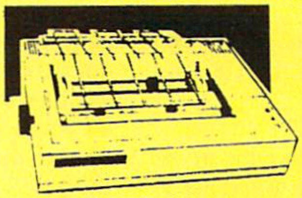
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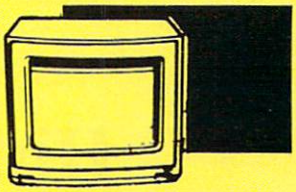
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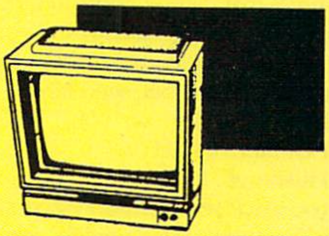
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COMPILED BY LOUIS F. SANDER

Tips & Tricks

Hints for Fun and Utility

Every month, we bring you a super collection of computer hints from readers all over the world. No matter what your area of interest or level of expertise, you'll find something to make your computer life more productive, more interesting or more exciting. To keep the column flowing, we solicit your short programs, useful programming techniques, computer room hints, and similar items of interest, and we pay up to $50 for the items we select. We look for new or recycled material that can be implemented with a minimum of time, effort and theoretical knowledge, and that is of current value to Commodore computerists of every kind. If you have an item that fits the bill, send it to:

Louis F. Sander
P.O. Box 101011
Pittsburgh, PA 15237

If you enclose a self-addressed stamped envelope, I'll send you our hint-writer's guide. Readers outside the U.S. may omit the stamp.

Typing in programs: Most people find great value in the programs published in *Commodore Magazine.* If you like to enter these programs, here's a compendium of hints to make your typing easier and more rewarding.

Magazine programs are not only useful on their own merits, but they can help you learn about programming. As you type them in, you absorb the vocabulary and syntax of BASIC, as well as the techniques for putting them together to make useful programs. In fact, the more attention you pay to what you're typing, the more you learn about your computer.

Typing is much easier and more accurate if a friend reads the lines to you as you type them. If your friend is into computers, you can both learn a lot from the process. In the absence of a friend, you can read the material into a tape recorder, then play it back as you type. It's very useful to have a footswitch for your recorder, so you can stop it between lines or phrases.

There are many commercially available stands and other devices for holding the magazine as you type from it. Some even have magnifying glasses to make it easier to see your material. Avoid the ones that use magnets, since they can be hazardous to your disks or tapes.

You can use a copy machine to make copies of your programs before you type them in, and then you can mark or mutilate these copies at will, preserving the value of your magazine. If your copy machine has an enlarging feature, you can use it to make your copies easier to work with.

Some people use a felt-tipped highlighter to cross off lines as they type them, while others highlight every second or third line before starting to type. Scotch Post-It™ notes also make nice markers to keep track of your place on the page.

You can save typing time by eliminating the REM statements in the program. They help in understanding the program's flow, but they take a long time to type. If a line contains a REM statement and nothing else, it's a good idea to retain the line number and the REM, even if you eliminate the rest of the line. This protects you from errors if the programmer has used that line as a target for a GOTO or GOSUB.

When typing long programs, use the checksum program available in the magazine. (You'll find ours printed in every issue under Magazine Entry Programs.) By presenting a unique code for each line, they let the computer determine whether the line has been typed correctly. If you use them, there's no need to proofread your work. We don't use checksums in this column because most of our programs are very short.

If you don't use the checksum programs, there are other techniques for easier proofreading. The easiest is to list your work on the printer, so you can use the listing rather than the screen from which to proofread. If you use the screen, proofread from the top line, then scroll it up off the screen when you're finished. This way, the line you're working on is always at the top of the screen.

Since it's very easy to leave out a parenthesis, always count the parentheses in the lines that give you errors. If the total is an odd number, you know you've left something out.

When proofreading DATA statements, always look for extra commas and spaces or periods in place of commas. If you have a voice synthesis program, use it to read the DATA statements aloud.

And last but not least, always save your work periodically while you are working on it. Nothing is quite so frustrating as spending hours typing in a program and having something erase it before you save it. Wise people save their work several times each hour, sometimes as often as every few minutes. Unwise people sooner or later learn why the wise ones do it.

Louis F. Sander
Pittsburgh, Pennsylvania

Temporary program names: When I'm developing a program, I save my work every 15 minutes or so to insure that I always have copies of the latest version and everything that leads up to it. While this is valuable, it has a few drawbacks: It tends to clutter the disk with programs that are very similar to one another; it requires a unique name for each version; and when the program has reached its ultimate state of development, all those preliminary versions have to be erased.

A very simple program-naming procedure makes it easy to manage these programs. I just name my first version TRY1, my second TRY2, and so on. When I make a major revision, say, right after TRY5, I name it TRY10. The next major revision, maybe after TRY14, is TRY20. It's very easy to remember the last number I saved, so it's just as easy to know the name for the next one. If I ever lost track, a quick look at the directory shows exactly where things stand, since the latest version has the highest number.

When it's time to erase these old backup versions, I can get rid of entire blocks of them at once. Scratching TRY? deletes everything from TRY1 through TRY9. Scratching TRY2? does the same for everything numbered in the twenties. The only thing to be careful of here is that I don't erase my final version! To be on the safe side, before scratching anything, I always save the current version with some name other than TRY.

Margaret Ittel
Los Angeles, California

More temporary names: Another way to name different versions of your developing programs is to name them by the last line number you have completed in the program. When you save the version that ends with line 370, call it —370. When you save the one that ends with line 510, call it —510, and so on. Once the program has been completed, save it under a "real" name, and use S0:—* to scratch all programs whose name starts with a dash.

Bill Wilson
Morgantown, West Virginia

Date and time in program names: Because programs are so often changed and improved, it's very useful to know the date and time that a given version was created. It's easy to accomplish that goal by including the date and time in the program name. Since a program name can have up to 16 characters, if you use four characters for the date and four for the time, you'll have up to eight characters left for the actual name of the program.

The system I use is to type the program name (up to eight letters) followed by an eight-character date-time group. The name WARGAMES02141100 would indicate that this version of WARGAMES was created on February 14 (0214) at 11:00 A.M. (1100). A version created on February 15 at 1:32 P.M. would be names WARGAMES02151332 (note the use of 24-hour military time format).

In four years, I've never failed to find a good name that fits in the eight characters allowed by this system. The benefits of having the data and time have revealed themselves countless times, as I've encountered different versions of the same program on the same or different disks, and have always been able to know, without a doubt, which is the most recent version.

Lucy S. Terrier
Alton, Illinois

Cartridge tips: If one of your plug-in cartridges stops working, try it out on another computer. If it works okay there, it may mean that your power supply is on its way out and doesn't have enough *oomph* to drive the computer and the cartridge together. It might also mean that your computer's cartridge port connector is dirty; you can often clean this problem up with a pencil eraser.

If you have a cartridge expansion board, it probably has a switch for disabling any of the cartridges inserted into it. Sometimes you can look into the cartridge ROM by powering up with the cartridge in place, then using the switch to disconnect the cartridge. BASIC's PEEK function can then often be used to examine the cartridge.

If you're capable of working on PC boards, you can install your own cartridge on-off switch by using a double pole switch to break the lines going to pins 8 and 9 of the cartridge port. To disable the cartridge, just turn the switch off. To enable it, turn the switch on and reset the computer.

If your cartridge uses one or more SYS or other commands, it's useful to write them on an adhesive label and fasten it to the top of the cartridge where you can refer to it as needed.

D.L. Jassby
Princeton, New Jersey

Datassette tips: You can use these hints even if your datassette is collecting dust at the bottom of your closet.

If it is collecting dust, you should consider bringing it out into the light. On two occasions I made errors that caused my word processor to hang up the serial bus, which prevented me from saving my valuable document. I hooked up my datassette and saved my work to tape, then reset the computer to get out of the hang-up. I also make tape backups of my most important programs, so if (when) my disk drive is out of service, I can still enjoy my computer.

For those who use the datassette on a regular basis, Radio Shack and other stores have a wealth of useful products for handling cassette tapes. A bulk eraser is very useful, as is a kit to repair cassettes. There's no end to the variety of boxes and storage cabinets, either. I prefer the soft plastic boxes to the hard ones, since they are more durable and less expensive, and can easily be used for sending tapes through the mail.

When buying tapes, it's good to buy the shortest ones available, since it takes so long to search for programs on a long tape. The C-10 tapes, with five minutes of recording time on each side, are wonderful if you can find them. C-30's are eminently satisfactory and widely available at low cost. Inexpensive brands such as Radio Shack's Concertape™ are perfectly satisfactory for Commodore use. Avoid C-120's like the plague, because the ultra-thin tape they contain tangles very easily.

To write-protect a tape, punch out the little plastic tab on the left side of the back of the cassette. To overcome the write protection, put a piece of tape over the punched-out hole. Scotch™ tape is fine; in fact, the write-protect tabs used with floppy disks are perfect.

Before using a tape for the first time, it's a good idea to fast forward it to the end, then rewind it. This process, which you might want to do twice, balances the tension and avoids potential tape jams. It's also a good idea to write down the tape counter reading at the end of the tape; it will be useful when you need to estimate how much tape is left on a partially-recorded cassette.

When using a tape, it is not necessary to run it past the plastic leader before recording. Commodore's excellent recording scheme takes the leader into consideration, and records only after it has passed the head.

To avoid load errors, it's good to avoid saving programs with identical names. Otherwise your computer, when finding the name of an old, partially-erased program, may think that it has found the program you want. Other ways to avoid these maddening errors are to bulk-erase old tapes before using them, and to degauss your tape head after every few hours of use. Head demagnetizers are available at Radio Shack or any electronics store.

On the 64 and 128, you can hear your tapes as they load by executing a POKE 54296,15. Turn the volume on your monitor all the way up and you'll hear some interesting things. With practice, you can tell from its sound whether a given tape is good or bad.

And finally, when your computer says it has found a program, you can quickly start the tape rolling again by pressing the SPACE, CTRL or Commodore keys.

Jerald Brown
Erlanger, Kentucky

On-line assistance: If you subscribe to QuantumLink or one of the other telecommunications services, don't overlook their customer representatives as a source of assistance with all aspects of their service. They are as close as a 1-800 phone call, and if you can state your problem clearly, the chances are good that they can help you. Before placing your call, research your problem as thoroughly as possible, and make sure you understand exactly what help you need. Write down your problem and your questions, then dial away!

Charles Brown
New York, New York

Centering text: Here's how to tell how much to tab a word or phrase to center it on the screen. Count the letters in your text and subtract it from the number of characters on a screen line, then divide the total by two.

This will do it in BASIC, assuming that your text is M$:

PRINT TAB((40-LEN(M$))/2)

Because of BASIC's way of doing math, you must put parentheses around the 40-LEN(M$). You don't need the INT function, because TAB performs it automatically.

Steve Dodd
Alberta, Canada

Fancy printing: Here are three subroutines that can add excitement to your screen displays. The first makes letters drop from the sky before lining up in the center of a screen line. The second zooms them in from the left, and the third makes them burst out from the middle of the screen. All you have to do is set the desired text equal to M$, then call the appropriate subroutine. Our listing includes a demonstration of all three routines.

You can use one, two or three of the routines in your own programs. To make them work with 80-column displays, just change the 40's to 80's in the three definitions of variable TA. In "dropping letters from the sky," variable TD determines which screen line they will settle on. The dropping letters will erase the lines above that one, except for line 1.

Thong Nguyen
Ft. Walton Beach, Florida

```
10 PRINT"[CLEAR] FANCY PRINTING
   ROUTINES - THONG NGUYEN"
20 M$="COMMODORE MAGAZINE"
30 GOSUB 100:PRINT
40 GOSUB 200:PRINT
50 GOSUB 300:PRINT
60 END
70 :
100 REM ** LETTERS DROP FROM THE SKY
110 TD=10:REM SCREEN LINE TO PRINT ON
120 L=LEN(M$):TA=(40-L)/2-1
    :FOR J=1 TO L:M1$=MID$(M$,J,1)
    :PRINT"[HOME]"
130 IF M1$<>" "THEN FOR K=1 TO TD-2
    :PRINT TAB(TA+J)M1$"[UP]"
    :PRINT TAB(TA+J)" ":NEXT
140 PRINT TAB(TA+J)M1$:NEXT
150 RETURN
160 :
200 REM ** LETTERS ZOOM IN FROM LEFT
210 L=LEN(M$):TA=(40-L)/2-1
    :FOR J=L TO 1 STEP-1
    :M1$=" "+MID$(M$,J,1)
220 IF M1$<>"[SPACE2]"THEN FOR K=1 TO
    J:PRINT TAB(TA+K-1)M1$"[UP]":NEXT
230 NEXT:PRINT
240 RETURN
250 :
300 REM ** LETTERS EXPLODE FROM CENTER
310 IF LEN(M$)/2<>INT(LEN(M$)/2)THEN
    M$=M$+" "
320 L=LEN(M$):TA=(40-L)/2:TB=L/2
    :TC=TA+TB:FOR J=1 TO TB:TC=TC-1
330 PRINT TAB(TC)LEFT$(M$,
    J)TAB(TB)RIGHT$(M$,J)"[UP]"
    :FOR K=1 TO 20:NEXT:NEXT
340 RETURN
```

INPUT without question mark: When using the INPUT statement for something other than a question, it's desirable to eliminate the "?" that appears after the prompt. There are several ways to do this, but the simplest and most machine-independent is this.

```
100 OPEN 1,0
110 PRINT "ENTER SOME DATA";
120 INPUT#1,A$
130 PRINT
140 CLOSE1
```

Line 100 opens the keyboard as an input device, and line 110 prints your prompt; don't forget the semicolon at its end. Line 120 puts your keyboard entry into variable A$. Line 130 moves the cursor to the next line, while line 140 closes the input channel. You can combine the steps into fewer lines if you'd like—I've separated them here to make them easier to follow.

Kaylee Fortney
McCandless, Pennsylvania

INPUT with quotation marks: By typing quotation marks before and after your response to an INPUT statement, you can include many otherwise unacceptable characters in that response. Commas, colons, leading or trailing spaces, and cursor control characters all normally illegal or ignored, be-

Continued on pg. 120

Personal Publishing
ON YOUR COMMODORE 64/128

By Loren Lovhaug

You too can create professional text and graphics on your Commodore 64 or 128 using GEOS. What follows is an example of what you can do—living proof that your Commodore computer can be a first-class personal publishing station!



The following three pages were composed and electronically designed by Loren Lovhaug, the managing editor of Twin Cities 128, a publication exclusively for Commodore 128 owners, using a Commodore 128, GEOS, and an Apple Laserwriter. These pages are the actual laser-writer dumps created with the 128, reproduced here to demonstrate the sophistication and quality these products bring to the Commodore world.

Personal Publishing

Five hundred-thirty years ago, Johannes Gutenberg quietly revolutionized the method by which information was disseminated throughout society, and in so doing, drastically altered his culture and our own. Gutenberg's moveable-type printing press emancipated books and other written material from the exclusive hands of the wealthy and the powerful, and thereby brought information and education to the masses. In fact, easily accessible and affordable printed material has made our modern educational, political, economic, and religious institutions possible.

Enter personal publishing, which, like Gutenberg's printing press, is quietly bringing the power of the printed word to the masses through the use of inexpensive microcomputers. Although people have been using microcomputers for word processing for over a decade, personal publishing is a rather recent phenomenon which involves much more than the simple creation, editing, and outputting of text with microcomputers. Personal publishing makes use of microcomputers as tools for the actual layout and design of printed material, including the electronic integration of text and graphics. Large newspapers and corporations had this technology for years on very expensive computer systems, giving them the luxury of creating and altering the layout of their publications quickly and easily without the hassle of physically having to "cut and paste" pictures and columns of text. Now you can utilize this same kind of power and sophistication for literally thousands of dollars less.

Consider producing professional quality newsletters, flyers, resumes, reports and proposals with typset-quality fonts and full graphics capabilities with your **Commodore 64** or **128**. It seems hard to believe this is possible with equipment that is readily affordable, but it is! You are looking at the proof. Professional publishing capabilities that most everyone can afford is truly revolutionary and available NOW!

GEOS and Personal Publishing

The introduction of *GEOS* (*Graphic Environment Operating System*) by Berkeley Softworks in early 1986 gave the **Commodore 64** and **128** microcomputers the potential to become true personal publishing machines. This is because *GEOS* allows users to very easily manipulate and integrate both text and graphic data in ways that were previously available only on much more expensive machines.

Both Berkeley and Commodore have demonstrated a great desire to support their products in the personal publishing arena by announcing several new products which greatly enhance the **Commodore 64/128** ***GEOS*** system for personal publishing applications. From Commodore there is the 1764 256K RAM expansion for the **Commodore 64C** (similar to the 1750 RAM expander for the 128). The 128 version of ***GEOS*** already supports these RAM expanders for use with a super-fast RAM disk. A 64 version of ***GEOS*** will do the same for the 1764.

In addition, Commodore has the 1351 analog "true mouse" controller which gives the serious ***GEOS*** user precise control of ***GEOS*** applications. These devices make working with ***GEOS*** a true pleasure.

Berkeley also has several ***GEOS*** enhancement packages designed to aid the personal publisher. *Desk Pack 1*, features a program called the *Graphics Grabber* which allows the use of pre-drawn clip art from *The Newsroom*, *The Print Shop*, and *PrintMaster* for integration into *geoPaint* and *geoWrite* files.

The *Writer's Workbench* includes an expanded full-featured version of *geoWrite* and full support of laser printing through a versatile program called *geoLaser*. In addition, included on the *Writer's Workbench* disk is a program called the *Text Grabber* which allows you to convert files created by most popular Commodore word processing programs into *geoWrite* files.

These GEO-tools are valuable additions to the GEOS system, which afford the user a great deal of flexibility when exercising his or her creativity.

Putting It in Print

At Twin Cities 128, we are committed to using the **128** in every phase of our production as a testimonial to what can be achieved with our machines. So for us, personal publishing with Commodore computers is not some pleasant pipedream, but an everyday reality.

Before the introduction of ***GEOS*** and the other products mentioned here, the design, layout and production phase of our operation was an extremely slow and tedious process that often forced us to compromise both the quality and content of our publication. This is because of limitations imposed upon us by the techniques and the software we had to use. To illustrate, consider Table 1, which outlines and compares our production process in our pre-***GEOS*** days with the way we now do it using ***GEOS***.

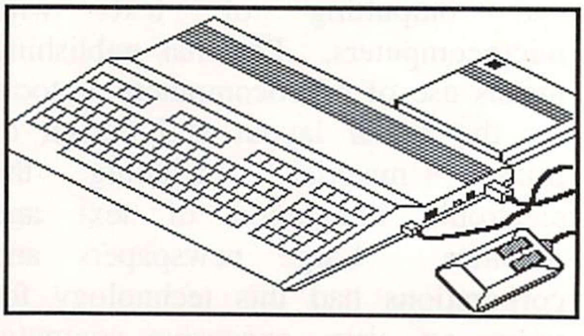


Table 1

Pre-GEOS Twin Cities 128 Production Steps

Step 1: Write, gather, proof, and edit articles.
Step 2: Convert article text to a common word processing environment
Step 3: Create double-column text output, either by using the column manipulation functions of various C-128 word processors, or by manually cutting and pasting columns of text onto layout paper.
Step 4: Print out text using NLQ dot matrix printer or daisy wheel printer.
Step 5: Create article headers (all text) with The Print Shop or PrintMaster
Step 6: Cut and paste article headers onto layout paper.
Step 7: Create internal graphics and external graphics for the front cover.
Step 8: Cut and paste together internal graphics and cover.

Current Twin Cities 128 Productions Steps

Step 1: Write, gather, proof, and edit articles.
Step 2: Convert non-*geoWrite* files into *geoWrite* format using the *Text Grabber*.
Step 3: Create internal graphics and article headers (both text and graphics) with *geoPaint*.
Step 4: Integrate *geoPaint* pictures with *geoWrite* text and set appropriate column margins.
Step 5: Create front cover with *geoWrite* and *geoPaint* as a whole integrated unit
Step 6: Laser-print pages locally or upload the pages to Berkeley Softworks via QuantumLink for laser printing. Double-column text formatting is achieved automatically through *geoLaser's* overlay option.

It was obvious to us that by using *GEOS* as an integral part of our production process we not only gained a more professional look (through the virtues of laser printing and enhanced graphics capabilities) but also saved ourselves an imse amount of time and agony by doing away with the manual cutting and pasting of graphics and text.

Your publishing applications can benefit from these same kinds of advantages. In fact, you don't even need access to a $5,000 laser printer (which most of us don't have). Berkeley Softworks is offering laser-printing services via your modem and QuantumLink. Simply upload your *GEOS*-created document to Quantum-Link and Berkeley will laser-print your document and mail it to you for just $3 for the first page and $1 for each additional page.

In addition, many local printing and copying centers are now offering laser printing to personal computer owners. Your next newsletter, your next resume, your next report, can have a professional look without having to pay for expensive typesetting, or agonizing over a can of rubber cement.

Let's face it, in today's competitive world both style and *substance* count. Now with your Commodore micro-computer, your printed output can have both. Having personal publishing capabilities on affordable computers is revolutionary, and is likely to spur a variety of activities in the Commodore world, as people realize what can easily be achieved using our inexpensive machines.

In the very near future I expect to see a variety of school and community newspapers, company newsletters, and club publications adopting *GEOS*-equipped Commodore computers to use as invaluable tools for spreading information.

Personal Publishing *Plus*

More Publishing Programs for Your Commodore 64/128

BY MATTHEW LEEDS

In addition to GEOS, there are a number of other products available for the personal publisher.

It all began with Broderbund's **The Print Shop. The Print Shop** designs greeting cards, stationery, letterhead, banners and signs. It was the first program to popularize home printing, and you see it in use everywhere. It's simple to use, fairly bulletproof, and has a large library of additional graphics available.

Print Master from Unison World is very similar to **The Print Shop.** It offers many of the same features, including the ability to add multiple fonts to a page and an on-screen preview of the finished page. You can also view your graphics on-screen.

The Newsroom from Springboard lets you create your own newsletter with graphics of your own design or from a library of shapes. Text is fitted around the graphics and you can add headlines and other creative touches. Springboard also created **Certificate Maker,** a program that designs and prints over 200 different awards and certificates. Each can be customized by the addition of text in a variety of styles and sizes. You may also create a name file for a set of certificates.

Hi Tech Expressions has a series of personal publishing programs. **PartyWare** prints out banners, party hats, ribbons, place mats and cards, a party-planning checklist, party game ideas, and thank-you notes for the guests. It also maintains a data base of names, addresses, phone numbers, birthdates, and other important information. **HeartWare** produces friendship and love notes. And **CardWare** creates greeting cards.









Solutions Unlimited does not compete with these programs, but instead, adds to them with **Billboard Maker,** a program that imports graphics from programs like **Doodle!, Koala, ComputerEyes** and **Blazing Paddles,** and then enlarges them to 2½ feet by 4 feet.

Another means of merge text and graphics is to use a utility program with your favorite word processor. One utility is the **Graphics Integrator** from Inkwell Systems. This program accepts graphics files from most of the popular graphics packages and converts them into a format that certain word processors can accept. Although this solution lacks typefitting capability, it has several advantages: You can use a full-featured graphics design program to create your images and a full-featured word processor to compose your text. You are not limited to any particular size on your graphics.

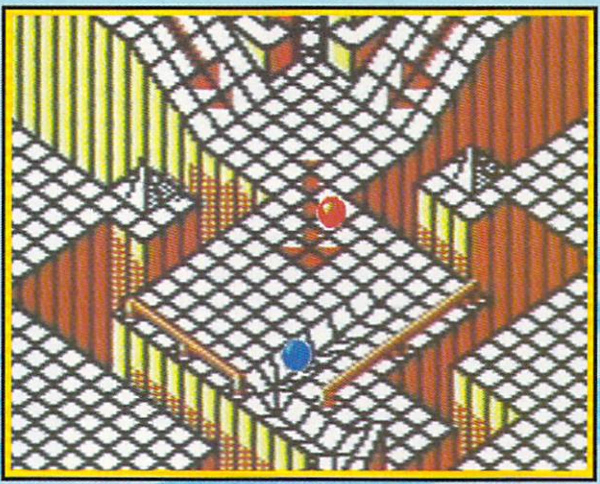
The computer age has always held the promise of a paperless society—no books, no magazines, no newspapers. But it's now obvious that this will not happen. Instead, computers have made it easier for everyone to produce more attractive and informative paper products, faster and in greater volume. Welcome to the era of personal publishing. ■

Go Ahead, Lose Your Marbles . . .

MARBLE MADNESS™

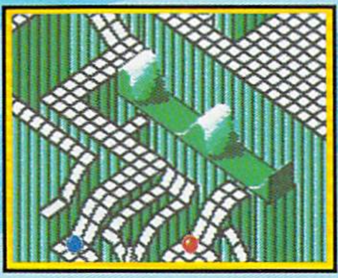
is Here !!!

The game that drove you crazy at the arcades now comes home. Same exciting gameplay, same blow-away graphics, sounds and music. We've even added an incredible all-new secret level.



A unique game experience that's crazy fun for everyone. Two players race to the goal line, or one player races against the clock. It's sports competition, kinetics and strategy.

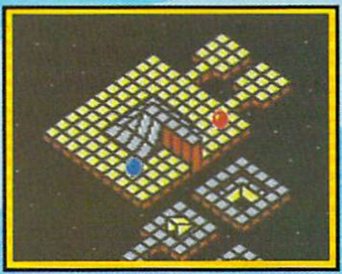
Ultimate Competition for 1 or 2 players.
The object is simple. Race your marble to the goal line, and don't let anything get in your way. It sounds easy, but it just might drive you nuts.



Spectacular Animation
Fantastic 3-D terrains are the raceways. Zany (but dangerous) enemies await your every turn. Avoid the deadly steelies and the pounding hammers. Watch out for the hungry marble munchers. Even surf a mechanical wave!



Secret Level
If you can find it, just wait till you try to get through it!



Incredible Madness
Marble Madness, the ultimate in exciting non-stop action. Each level has its own "personality" and creatures to contend with, as well as its own original music score. It's not easy being a marble – make it to the Ultimate Level and you'll know why.

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How to order: Visit your retailer. If you are unable to find the product at your local retailer, you can call 800-245-4525 for direct VISA or Mastercard orders (In CA call 800-562-1112). The direct price is $29.95 for the Commodore version. Amiga version is $49.95. Apple, Atari and IBM versions coming soon. To buy by mail, send check or money order to Electronic Arts Direct Sales, P.O. Box 7530, San Mateo, CA 94403. Add $5 for shipping and handling ($7 Canadian). Allow 4 weeks for delivery. There is a 14-day, money-back guarantee on direct orders. For a complete product catalog, send 50¢ and a stamped, self-addressed envelope to Electronic Arts Catalog, 1820 Gateway Drive, San Mateo, CA 94404. Commodore and Amiga are registered trademarks of Commodore Business Machines. Apple is a registered trademark of Apple Computer. IBM is a registered trademark of International Business Machines, Inc. Marble Madness® 1984, 1986 Atari Games Corporation and Electronic Arts.

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BY BOB GUERRA

The Computer Museum

Admit it. Now that you've been computing for a couple of years and have run literally hundreds of programs on your Commodore 64, you don't even notice the power-up message anymore. You take your computer for granted, as if it were a common clock radio or toaster oven. Maybe you've even upgraded to a Commodore 128 or an Amiga, and your 64 is now only used for an occasional nostalgic game of *Omega Race* or *Jupiter Lander.*

With the tremendous number of personal computers that have found their way into the workplace, the schools and our own homes over the last few years, it was inevitable that eventually we would begin to take them for granted the way we do other modern miracles like laser technology, space travel and Velcro™ closures on kids' sneakers.

Fortunately, there's a place where computers are still appreciated. A place where an inexpensive microcomputer like the Commodore 64 can take its place among classic systems of the past three decades and hold its head up high. The place is The Computer Museum of Boston, and it's the world's only independent museum devoted exclusively to computing.

The Computer Museum, located at 300 Congress Street on Boston's Museum Wharf, began seven years ago in Marlboro, Massachusetts, as a place to display classic computers that had been saved from the scrap heap—machines like the Whirlwind, a five million dollar research computer dating back to 1945, or the first commercial computer, the Univac I, that correctly predicted Eisenhower's victory in the Presidential election of 1952.

Today the museum also features a collection of classic personal computers, including the Commodore PET and 64 as well as several working PCs that visitors can use in a "hands-on" environment. "Microcomputers like the PET and the Commodore 64 have made the information revolution accessible to everyone. Without them, the use of computers would never have penetrated as deeply into our culture," said Dr. Gwen Bell, the museum's president. "They deserve a place in The Computer Museum because they represent a significant class of computer and because their wide acceptance has made them classics."

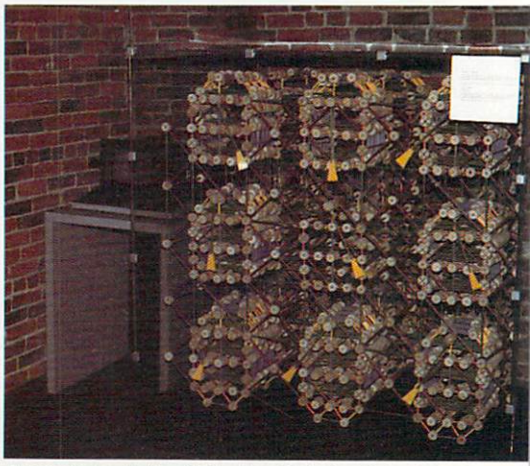
When you visit the museum, you can challenge your skills as a pilot with an advanced flight simulator, design an automobile, or test your programming ability by writing a single set of instructions to guide an on-screen turtle through a series of increasingly difficult mazes. If you're artistically inclined, you can create a work of art with a light pen and graphics tablet using a program that can also recognize letters and numbers drawn free-hand (as long as your printing is legible).

I was just completing a masterpiece with this program when a voice came from the unattended terminal beside mine. "Hey you." (I looked around.) "That's right, you. Come over here and type any word and I will say it." The computer was DecTalk from Digital Equipment Corporation, but the voice was definitely that of a middle-aged man. Like the Amiga, this machine can say virtually anything you care to type and do it at user-selectable speeds and voices, both male and female, young and old. While the voices haven't completely lost their "computer" accent yet, they are surprisingly clear and human-like.

In a section of the museum devoted to image processing, you can use a computer to graphically simulate a glass teapot. The real teapot sits under colored lights and you can manipulate it to affect the computer-produced image. Another exhibit lets you create a digitized picture of your own face and distort it by adjusting the color and contrast. Unfortunately, (or maybe fortunately, depending on how the picture comes out), you can't print a hard copy of your face when you're

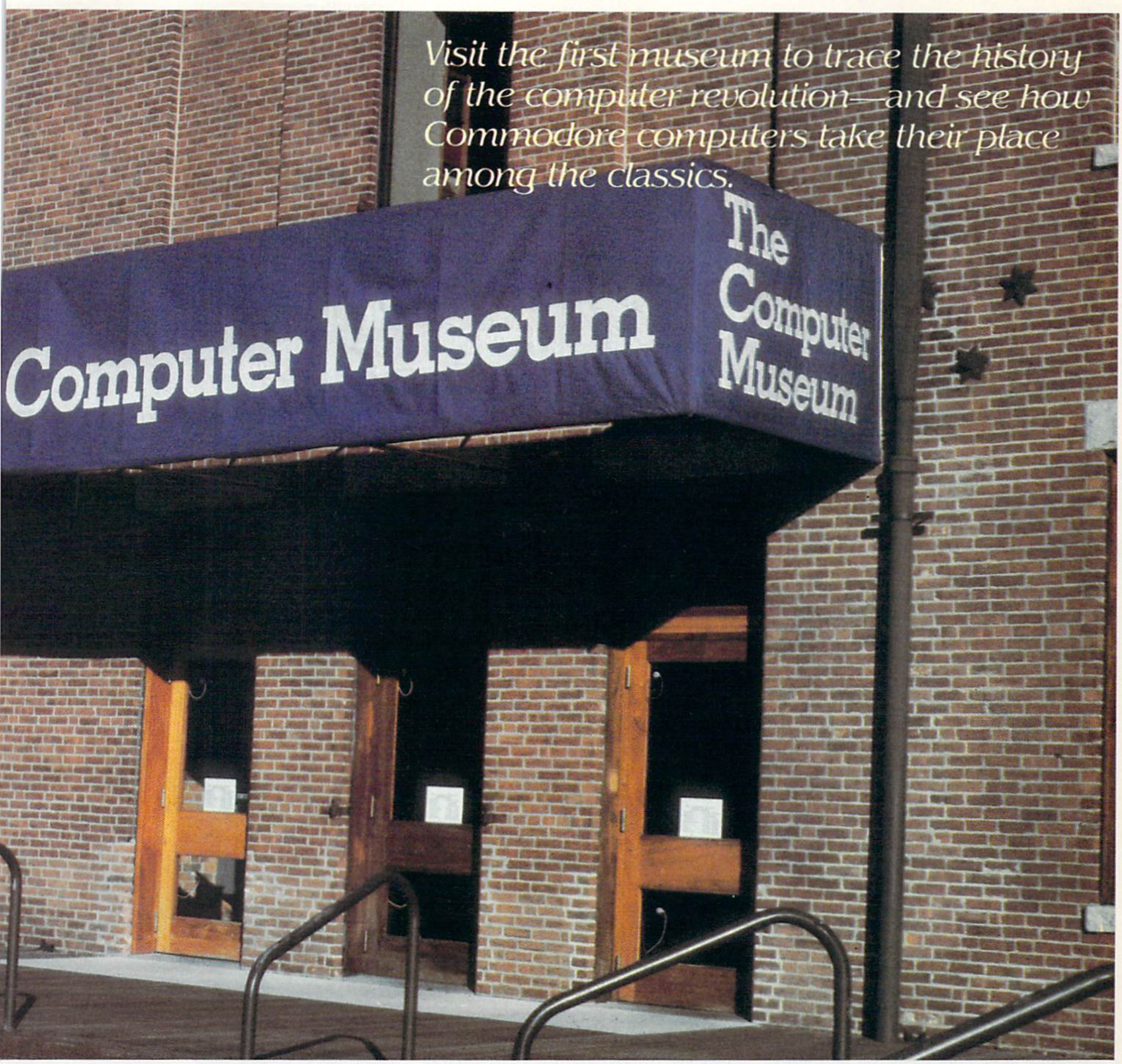


The Computer Museum



A computer made from Tinker Toys that plays tic-tac-toe.

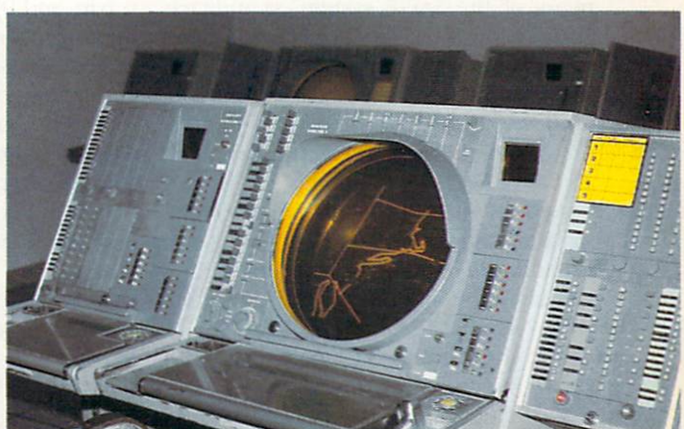
Visit the first museum to trace the history of the computer revolution—and see how Commodore computers take their place among the classics.







The Commodore PET and C64 take their place in the PC Gallery.



Command Console from the SAGE radar defense system.

done.

Other interactive exhibits let you punch your own computer cards using a working keypunch machine from the 1960's, play a classic computer game like *Spacewar;* or examine an integrated circuit under a microscope. The museum even has toy computers like Texas Instruments' Speak 'n' Spell™ that young visitors can use.

Young computer enthusiasts will also enjoy the museum's collection of animal models created for a popular, long-running ad campaign by Honeywell. The incredibly detailed models, including a fox, St. Bernard, grasshopper and American buffalo, are made completely from wires, microchips, transistors, and other small electronic components.

Of course, like most museums, The Computer Museum has a lot of artifacts which are simply too old or too fragile for visitors to touch. One that immediately comes to mind is a large computer designed specifically to play tic-tac-toe. "Big deal," you say. "My 64 can play chess, checkers, backgammon, reversi, black-jack, and *Ultima IV*." What makes The Computer Museum's tic-tac-toe champ so remarkable is that it's built entirely out of Tinker Toys™!

For everyone who has ever cursed their 1541 for being too bulky, too slow and lacking in storage capacity, the museum has an old magnetic drum data storage unit that's about the size of a small condo (well, maybe not quite that big). The unit contains six magnetic drums, but the combined storage capacity is less than that of a standard 5 1/4″ floppy. Think of that the next time you're impatiently waiting for *Pinball Construction Set* to load!

This magnetic drum unit is just one of several historical displays that will give you a greater appreciation of the speed, power and compactness of today's microcomputers. Another is the museum's exhibit of some of the major components of the SAGE system—a military computer used to monitor North America's airspace from the late 50's to 1983. The entire system weighed 175 tons and used 55,000 vacuum tubes. Just think of the electric bills you'd run up playing *F-15 Strike Eagle* on that thing!

And for those of you who dabble in machine language, SAGE's accumulator alone is 30 feet long. In your 64, the accumulator is only one part of the 6510 (8502 in the 128) microprocessor—whose entire casing is roughly the size of a pack of gum.

In addition, several of the SAGE's command consoles are set up to recreate the environment of a military air defense center. If you've seen a lot of war movies, you'll probably recognize the flashing round display that was used to trace enemy flight paths and direct intercept missions.

At regular intervals during the day, the museum also shows vintage films of classic computing devices dating back to as early as the 1920's. Again, the contrast between the state-of-the-art personal computers of the 1980's and their digital dinosaur ancestors is amazing. The Computer Museum's "Timeline," a glass-encased collection of documents and artifacts from the first two decades of computing, also provides a sense of the 64's remote genealogy.

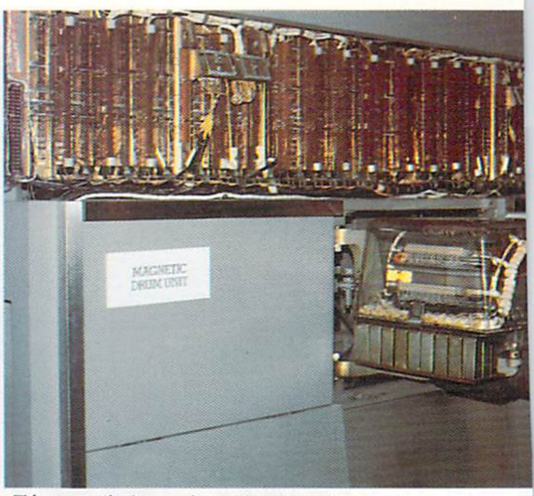
"Computers have been around for the last 40 years, but in that time they have changed dramatically," said Pat Fiorelli, Public Relations Manager for The Computer Museum. "In a relatively short time, they have evolved from huge vacuum-tube dinosaurs to the desktop microcomputers that most people are familiar with. When people who are new to computers come to the museum and actually see how it all started, they're shocked."

So the next time you flip on your 64 and push *Lode Runner* into your 1541, before your fingers have a chance to enter LOAD " ,8,1—take a look at the screen and think of the day you got your first computer. Think of its rich heritage and the years of research, experimentation, advances in design and miniaturization that made personal computers like the Commodore 64 possible. And finally think of a place in Boston that is trying to preserve this amazing history.

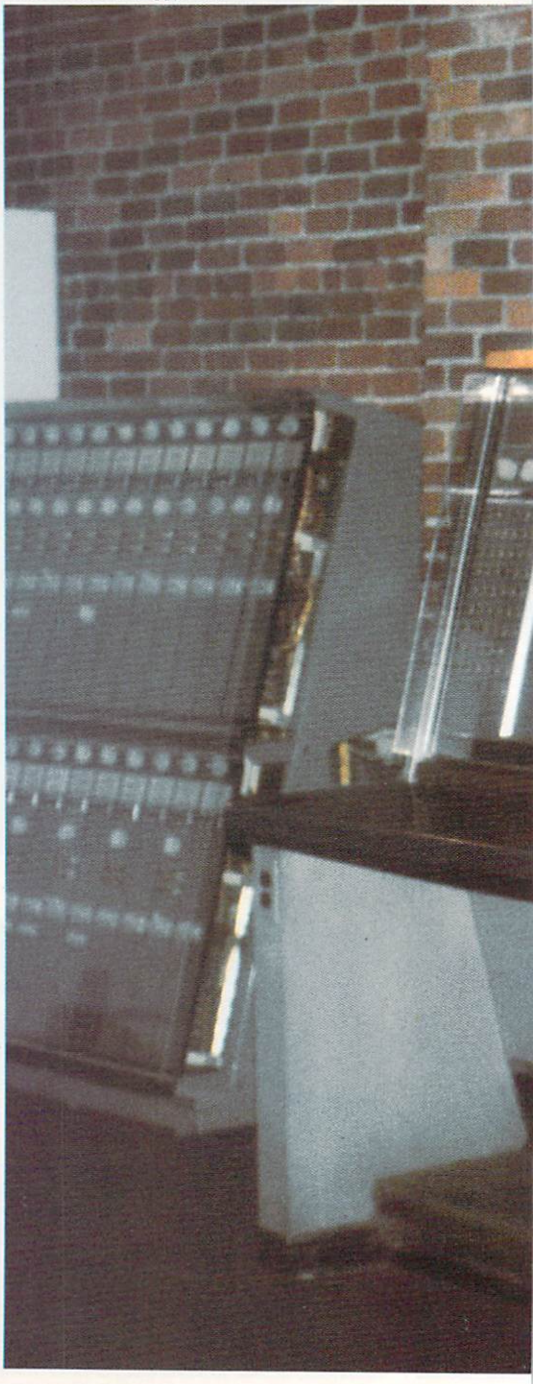
Then go waste a few Bungeling guards.

The Computer Museum is open daily from 10 a.m. to 6 p.m. and on Thursday and Friday from 10 a.m. to 9 p.m. The cost of admission is $4 for adults and $3 for students and senior citizens. Children under five can explore the museum free of charge, and on Friday nights between 6 p.m. and 9 p.m. The Computer Museum is free for everyone.

Becoming a Computer Museum member entitles you to free admission to the museum, a subscription to the museum's illustrated quarterly magazine, a Museum Store catalog, as well as a 10% discount on computer books, chocolate floppies, computer jewelry, and other items purchased from the store. If you'd like to learn how to become a member, or if you'd just like more information about the museum, contact The Computer Museum at 300 Congress Street, Boston, Massachusetts 02210, or call (617) 426-2800. C



This magnetic drum unit could hold about as much data as a 5 1/4″ floppy disk.



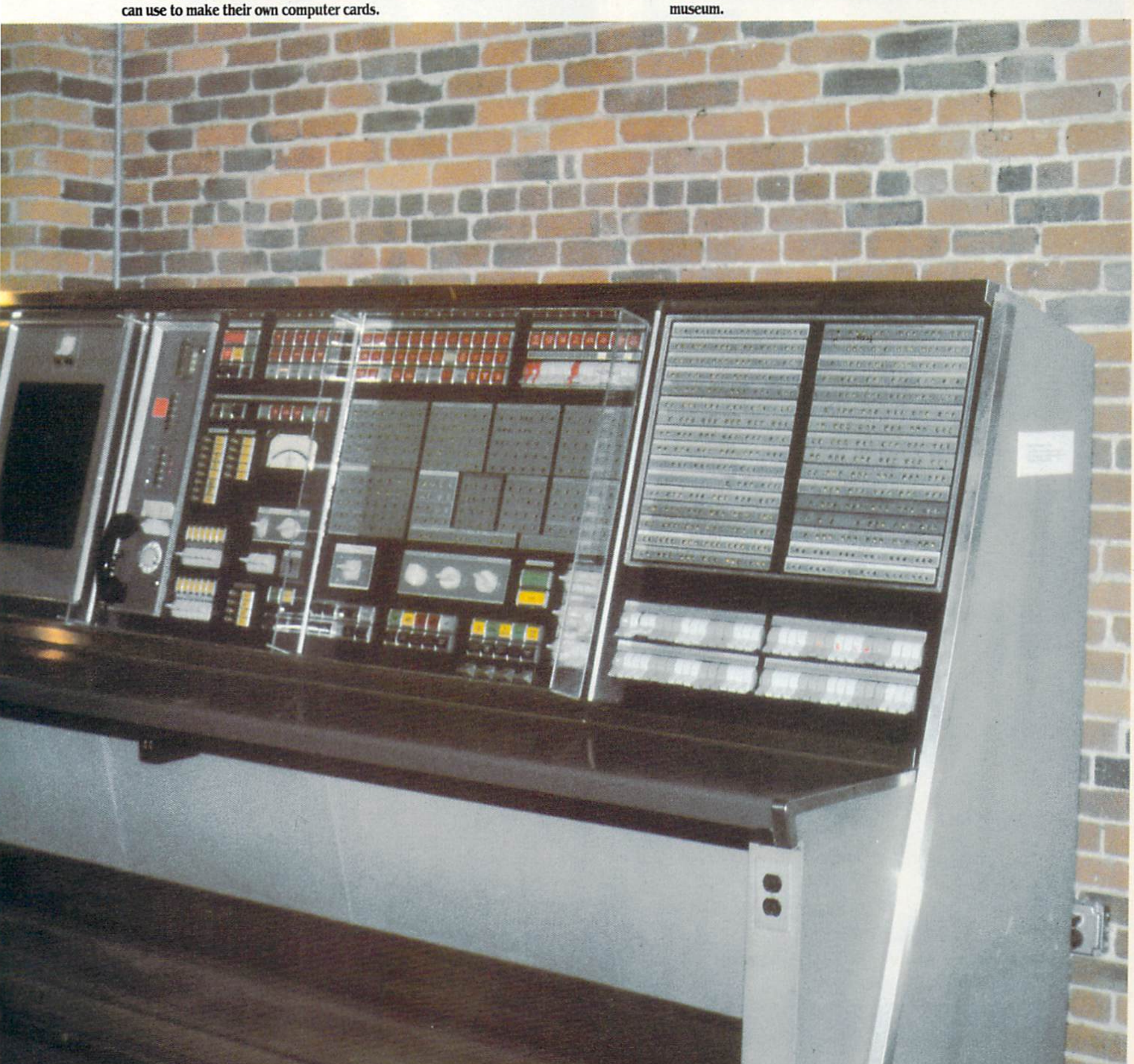




A working keypunch machine that museum visitors can use to make their own computer cards.

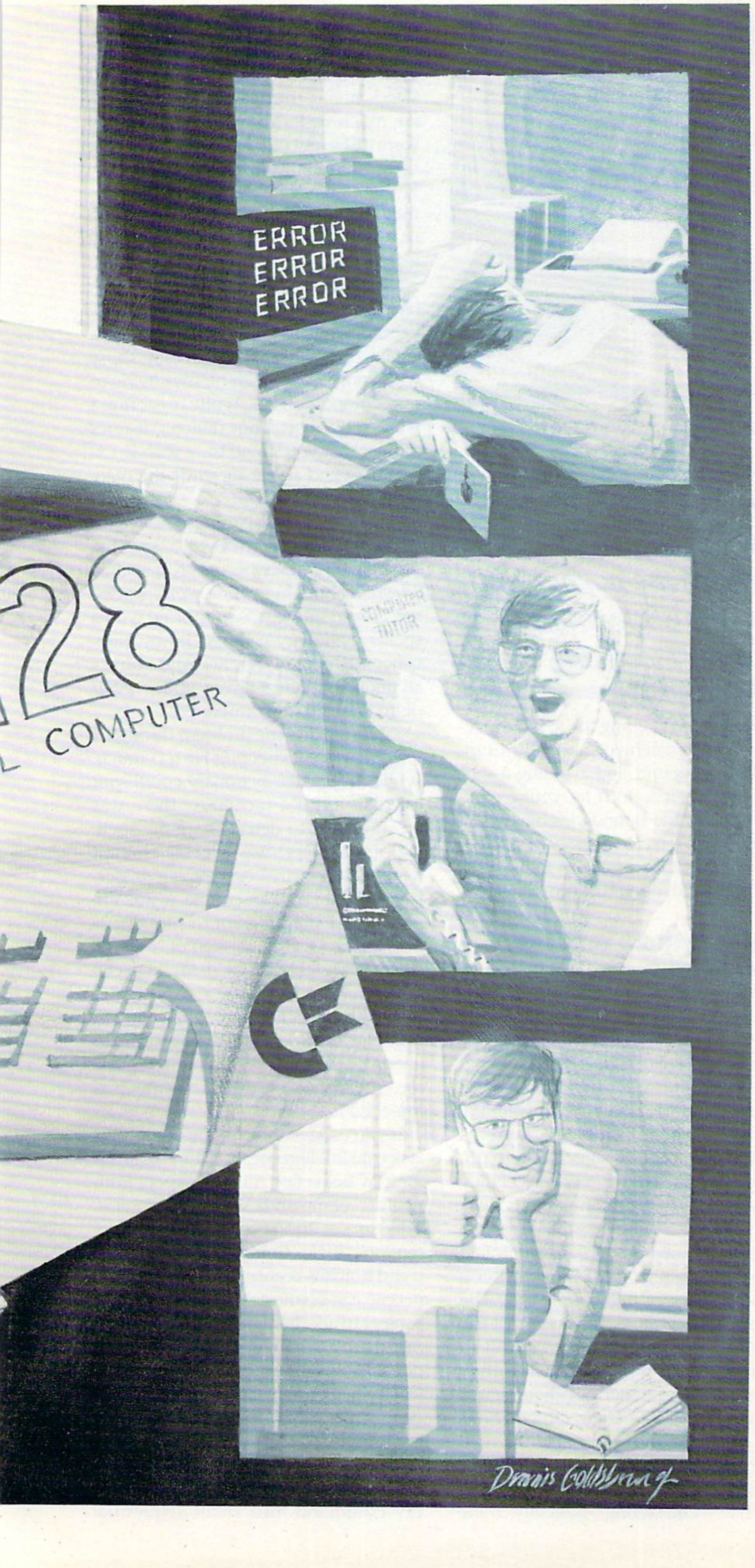


A color plotter draws the view of Boston from the museum.



Main control panel of the AN/FSQ-7, the 1950's US Air Force computer for the radar early warning system (SAGE).


COMMODORE
PERSONA



Don't Panic—Yet

BY GARY V. FIELDS

A Guide for New Computer Owners

Few new computer owners escape the first few months without some trying moments. Here are some pointers on what to expect and how to avoid the usual pitfalls. And for you seasoned computer owners — don't be surprised if you learn something too!

With curiosity, I watched a man with three teetering boxes struggle across the store's busy parking lot. His head darted from side to side in an effort to see around the packages as he made his way to the door. The bottom box bore the familiar Commodore 64 label. Perched above it was a new disk drive and monitor. I opened the store's door for him, and as he thanked me, I questioned why he was taking the system into the store instead of out. He gave me a disapproving glance and replied that the darn thing was broken. As I got him a cart for the boxes, I squeezed in a second question, "What's broken?" As he disappeared in the direction of the computer department, he responded, "The darn thing won't save stuff. The drive's light just starts blinking." Quickly I shot my last question: "Did you for-

mat the disk?" In a moment his head reappeared around the corner and his mouth formed two words: "Do what?"

First, the story is true and second, it is not uncommon. Many new computer owners have a tendency to panic when they first encounter the wall of today's technical terms and computer jargon. What the man had done was "over expected" the computer's ability to understand human ways. He had told it to save a program, and when it refused he panicked—assuming something was wrong with the system instead of the system's operator.

When he first bought the system, he had expected the computer to do all the work while he simply issued commands. Actually, that's the way it is supposed to work—humans give orders and computers execute. But the problem is the little creatures don't always understand the King's English. Your instructions have to be issued in the correct sequence, using the correct command for the computer to understand. For instance, the fellow in the store had never told the computer to prepare (format) a disk to accept files. If he had only read and understood his disk drive's manual, he could have been enjoying his computer that cold autumn morning instead of anticipating a steamy struggle with the store's manager to exchange his "broken computer."

More than a few computer owners engage in what seems to be an unwinnable battle between man and machine. They find there is too much to remember, too many wires to connect, too many commands to memorize, too many manuals to read—and too little time. Confronted with an ever-enlarging stack of manuals to absorb and peripherals to supervise, the marriage between owner and computer heads quickly to divorce court. The reason—irreconcilable differences.

When someone tells me they've bought their first computer, I give them the same advice I offer newlyweds: Give your mate the benefit of the doubt, learn to listen to each other, and never put all the blame for a spat entirely on the other. For computer owners I add, "If you don't think the thing is broken at least ten times in the first month, you're not using it enough." So far no novice has passed the first month without thinking their system had died at least a half dozen times. But upon careful investigation, it is usually the user, not the system.



Quickly I shot my last question: "Did you format the disk?" His head reappeared around the corner and his mouth formed two words: "Do what?"

The trick to keeping the joy in the relationship between you and your Commodore computer and avoiding a split is threefold: First, don't let your expectations cross the boundaries of realism; second, don't try to master every device or software package in a single sitting; and third, do your homework.

Expectations and the Real World

Expectations are always sky high when you meet your first computer. You expect it to do miracles while you sit back and collect the benefits.

In 1984 almost all of my friends were eager to join the computer revolution. Most approached their first systems with enthusiasm—eager to put the thing to work. They intended to enjoy it, use it, master it. Four friends (college graduates, two with Masters degrees) not only bought systems, but enrolled in night classes to learn BASIC. After a month of classes, one couple quit. The other finished but complained that the language was unreasonably difficult to learn and that all the software they were using was either poorly designed or was "broken." Their expectations had dissolved into disenchantment—the honeymoon was over and the marriage was on the rocks.

What went wrong? Basically, their expectations exceeded the realm of realism. The phrase "user friendly" had disarmed them and when the truth struck home, they gave up. Computers are much easier to use now than they were just a few years ago, but mastering them still requires time and effort.

Computers can't perform miracles—they can simply do what you tell them to do and do it very fast. You have to learn their language. If you are using a word processor and want to delete a block of text, you must know the proper commands to perform that function. While this is a simple task for those who know how, it can be mystifying to new computer users. While mastering a word processor is not difficult, it does require that you spend time with it, experiment and above all, study the manual.

My first personal experience with over-expectation involved a spelling program. I've never been a great speller. So when I bought my first word processor, I made sure it was supported with a speller/dictionary package. In my innocence I expected it to find and correct all my grammatical errors, and when it didn't, I was disappointed.

After thinking the problem through, I realized I was expecting far too much. While the speller/dictionary could spot words it did not recognize, there was no way for it to determine if my spelling of "corollery" was a feeble attempt to spell "corollary," "coronary" or perhaps "krona." And, of course, it was impossible for the program to spot errors of word usage ("to" instead of "two" or "there" instead of "their"). My expectations had exceeded the realm of realism. Actually, after overcoming the initial disappointment, it was reassuring to know that the speller couldn't replace me. The system needed me as much as I needed it.

It's no exaggeration to say computers lack true intelligence. But they make up for it by being fast. All they expect from you are commands which are logical. Therein lies the second point of contention—logic. Computers insist upon it and humans regularly ignore it. While people can comfortably jump from one subject to another and back again, computers perform commands in sequence, one at a time. Their redeeming feature is that they can remember your commands and perform them lightning fast.

The trick to mastering the computer is to think the way it does. It breaks every command into small sequential

steps. While you could tell your son to mow the grass and he would understand (he might not do it but he would understand your intent), the same command for a computer would have to be broken down into several short commands like this: Go to garage. Open garage. Get mower. Roll mower to sidewalk. Engage choke. Pull start chord. Adjust throttle. Locate lawn, and so on. The computer wants specific commands, not general orders. This takes some effort on your part, but once the computer understands your commands, it will perform fast and flawlessly (something sons rarely do). If you can train yourself to think in these short, logical, sequential steps, you're on the road to computer bliss. Remember, what may be completely clear for human brains may be a real brain-twister for your computer.

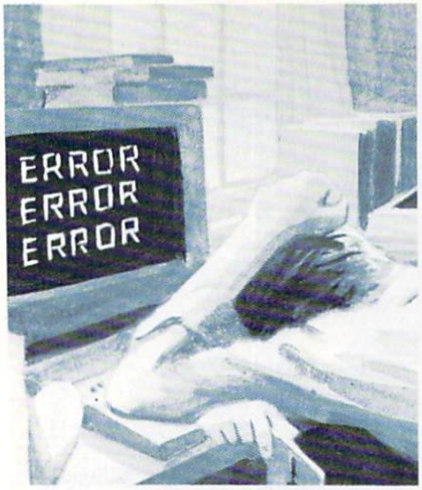
The bottom line is learn to communicate and don't expect the impossible from your computer. If you do, you'll be disappointed.

Mastering Peripherals and Software

I had an unfair advantage mastering my first system—I couldn't buy it all at once. The system was delivered piece by piece over a six-month period. Although this was frustrating at the time, it allowed me time to become familiar with each piece of equipment instead of being overwhelmed by trying to get a computer, disk drive, modem, monitor and printer to talk to each other all at the same time. I highly recommend this one-on-one approach to new computer owners.

If you've never used a computer before, just communicating with it is an adventure, much less trying to master it and all its add-ons at once. I always suggest that new owners approach each unit individually (though few people take my advice). Take the computer first—spend a week trying it out and go through its manual cover to cover. During this shake-down cruise, use the disk drive only to load programs. When you run across an unfamiliar word or phrase—look it up in the system guide's glossary or your computer dictionary. When you are comfortable with the computer, repeat the procedure with the disk drive.

The last piece of equipment to tackle should be the printer. Beware of this beast—when mastered, it will become one of your favorite servants, but until that time it will buck at every opportunity.



Some software developers will store a file called "READ ME FIRST" on their disk. This file will contain instructions not included in the manual.

With the proper interface, any printer can talk with any computer, but the proper handshake requires that every dip switch (tiny switches, created by ill-natured elves, for the sole purpose of preventing the marriage of a computer and printer) to be flipped in the correct direction. Just for that reason I advise that new computer owners buy printers designed specifically for their system. Later, after you've mastered everything else about your system and are looking for a new challenge, buy a printer that requires an interface.

The complaint I hear the most concerns software which either doesn't work or doesn't work as the buyer expected. I've been besieged more than once by a panic-stricken friend complaining that a product I had recommended wasn't worth the disk it was stored on. After they vent their frustrations, I'm usually able to help them reconstruct the events preceding the software "failure" and find the problem.

Again, with but a few exceptions, the error was theirs. Either they had not read the entire manual or else they did not understand all they had read. Most often, in their zeal to use the product, they had only half read the documentation and panicked when they encountered uncharted territory or the software seemed to lock up waiting for a command they never gave. Fortunately, this rush-in approach to exploring new software is rarely dangerous to either the software or the hardware (although it can strain friendships occasionally).

Over the years I've developed my own method of exploring new software. First, I always cover the write-protect notch on the disk so I can't accidentally write to it. Next, I always call up the disk's directory and list it to my printer. This information is often helpful because some software developers will store a file called "READ ME FIRST" on their disk. This file will contain instructions not included in the manual. This information usually concerns changes pertaining to the current version of the software made too late to be included in the manual. The directory may also reveal demos or test files which can be loaded to test the software. These are great when using productivity software such as spreadsheets or data bases.

Those chores behind me, I load the program (yes, before reading the manual) and simply see what it looks like. This serves two purposes. First, it lets me get over the pre-opening excitement each new product generates. But more importantly, it lets me see some of the screens I will encounter and test some of the keys. This information always makes understanding the manual easier.

Next, I browse through the manual once, spot reading items which sound interesting or unusual. Then I try the program again.

Now I'm ready to get serious. This requires reading the manual from cover to cover. If the manual is for a productivity program which I will be using in the future, I usually attach descriptive plastic tabs to the edge of the pages which begin each chapter or contain important information (table of contents, quick reference, and so on). This task takes a little time, but quickly pays for itself when I need to find information in a hurry.

After all that, I'm normally able to use the majority of the program's features. Less often needed features I leave until I really need them (things like superscript, subscript, graph displays, macros, complex calculations). I've always found it much easier to learn when there is a reason to learn.

Homework Comes First

We all dislike admitting that we could be at fault. It is much easier to blame the computer, the software, the disk manufacturer or the child who played with the system last. But it has been my experience that more often than not it is I who am at fault when I think my system dies. In the past four years I've had only one disk that was actually bad. The SID chip on one of my 64's has failed (I electrocuted it making a monitor chord). Dozens of software programs have failed to respond as I expected, but fewer than ten succumbed due to programming errors. On the whole, the major problem was me—what I was doing, what I expected or what I did not do—which caused the product to fail to meet my expectations.

I can sympathize with anyone who has struggled with phrases, words, manuals, switches, cords, boxes and commands they don't understand. The first time I hooked a monochrome monitor to a color computer, the screen display was unreadable. I called the company I'd ordered the monitor from (in California) and told them my problem. The salesman suggested I change the screen display to black and the text display to white. He offered the correct commands and memory locations to do that, but I assured him I knew how.

To make a long story short, what the salesman had said and what I understood him to say were entirely different. After trying again to correct the screen display and failing, I promptly panicked and returned the monitor to California. When the replacement arrived I forced the United Parcel Service driver to wait until I hooked up the new monitor. It wouldn't work either! I entered level two—Advanced Panic. I returned the second monitor and got my money back. But the problem was not the monitor, nor the salesman—the problem was me. I knew and understood less than I thought, panicked quicker than I should have, and assumed the system was broken when it was not. I should have listened better and made sure I understood what I heard. Believe me, it is more embarrassing, frustrating and expensive to not ask "foolish" questions than it is to ask. When in doubt—ask.

So the key to surmounting the obstacles in the path to computer literacy is understanding the technology and the terms it uses. Many of the key words



Few people visit a foreign country without carrying a translation dictionary, but don't hesitate to enter the world of computers unarmed.

and phrases, like data, interface and upload have become part of our vocabulary and are readily understood. But if you hope to become computer literate, you'll need a source of information which will explain the other words and terms you will encounter—a computer dictionary. Most problems I've encountered with manuals, computers and computer owners occur because people do not understand the terminology.

For instance, when I first became interested in moving beyond BASIC into machine language, I came across the label "Machine Language Monitor." I had no idea what this kind of monitor was. A quick look in my computer dictionary supplied the information. Few people would visit a foreign country without carrying a translation dictionary for the country's language, but don't hesitate to enter the world of computers unarmed. If you want to understand and be understood, you must know the language. There are several good dictionaries on the market, but the one I prefer is *Computer Dictionary* compiled by Sippl and Sippl and published by Howard W. Sams & Company.

The key requirement if you ever hope to master any product (hardware or software) is that you read the manual. Fred Schmidt, Director of Marketing at MicroProse, agrees. When they hear from an unhappy user, more often than not the problem is rooted in the user's failure to read the entire manual. "You just can't play our games unless you read the manual," said Schmidt.

Janet Brito of Briwall, a mail order house which handles imported software, echos Schmidt's observation. "The people who use our products are usually advanced computer users who know what they are doing. Occasionally they will target a bug in a product, but more often the problem they encountered is simply that they didn't read the manual."

The Menu, an information service which keeps track of over 75,000 different software programs, hears from thousands of software users each year. Jody Brexa, the service's Marketing Coordinator, explained, "People jump to conclusions if they are having a problem. They just automatically assume it is a problem with the system. People want to turn on the computer, get on and run programs without learning about them. Some manuals are difficult to read so people simply skip them."

Thankfully, manuals are becoming easier to understand and are more complete than they were just a few years ago. At one time, the only people who would read a manual were the people who worked on computers all day. Now that a large segment of the population uses computers but has little interest in knowing how they work, software developers are beginning to write their manuals so even the novice user can understand.

Conclusions

Don't panic until you are sure there is a good reason. Nine times out of ten the problem is something you are doing instead of a hardware or software error. Try to think the way the computer does, breaking large chores into small logical tasks. Thinking the same way the computer thinks makes pinpointing problems simply a matter of elimination. Buy a good dictionary so you can understand what you are reading and then, no matter how boring or time consuming—read the manual. The difference between a good marriage and a failing one is good communication. The same is true with computers. The manual is the computer's attempt to communicate with you, so read it carefully.

Pre-Panic Check List

If you are having a problem, don't assume the system or the software is at fault until you are sure. Before panicking, try this.

1. Make sure everything is snuggly connected, and the power is on. Brian MacDonald, one of Commodore's Customer Support Representatives, said he was amazed at how many people called with a dead system, only to find the power chord had fallen out of the outlet. Before you panic, make sure all the loose ends are in place. Eliminate the simple problem areas first.

2. If the system doesn't work after power is supplied, check each unit individually to make sure it is on and receiving power. It's not unusual for a printer and disk drive to "hang" if operations are disrupted in the middle of a command (aborting print while using a word processor, for example). If this happens, manually turn each unit off and on (not the computer) and issue the command again. Another way to break the grip of two confused units is to call for a directory listing (LOAD"$",8 via BASIC or whatever command the program you are using requires). This usually separates the battling peripherals and returns control to you.

3. Some software is very sensitive to certain peripherals. Your computer has several ports (for printers, joysticks, modems) which when used may confuse some programs. For instance, the early program disks for QuantumLink sometimes refused to load properly if a printer was connected. A joystick plugged into the wrong port will either send the wrong signal or no signal at all, and some software will not load if a fast-loading disk utility is used. So when I encounter a program problem, I always disconnect all the peripherals and disable special utilities not required for that program before assuming the software is defective. Nine times out of ten that solves the problem.

4. To determine whether the software is at fault do this: Turn everything off, wait a minute and start all over (turning the computer on last), using software which you are sure works with your system. If the system fails, then you have eliminated the software from the problem list, so proceed to step 5. If the software fails, proceed to step 6.



The trick to keeping the joy in the relationship between you and your Commodore computer is three-fold: First, don't let your expectations cross the boundaries of realism; second, don't try to master every device or software package in a single sitting; and third, do your homework.

5. To determine which piece of hardware is at fault, try this. Take your system to a friend who has a similar system and reconstruct the sequence, using the suspect software. (If the software fails with his system, then suspect a user error—reread the manual.) Now, switch from one peripheral to another. If the error occurs using the same sequence of action, then you can assume you have a hardware problem. Proceed to step 7.

6. Stuck disks are the most common problem I cross with commercial software. If, after inserting the disk and performing the manual-specified load command, the attempt ends with a "FILE NOT FOUND" message, chances are the disk is sticking in its sleeve. To check, try this: Carefully cradle the disk between the forefinger and thumb of one hand and insert two fingers of your other hand in the disk's hub. Now try to spin the magnetic disk inside the protective sleeve. If it does not turn freely, that's probably the problem. If the disk can't rotate, the drive can't locate the disk's files/programs.

You can usually loosen the disk by continuing this back and forth rotating motion. If that fails, I would return it—providing that it is still under warranty. If your warranty has expired, hopefully you have taken advantage of the company's backup policy.

7. When your child is sick, the first thing you check is his or her temperature—if it's high, the child is ill. Computers are a little like that, too. If they get hot, they sometimes act sick. If the temperature of the room in which you are working is comfortable, then it should be just fine for your system as well. But if it is too warm, do something about it. If a window allows a bright sun to heat your system—pull the shades. If a heat vent blows directly on the system—move the system. If heat remains a problem—buy a fan and let it blow across the disk drive and computer's power pack while the system is on.

8. When you've eliminated all the user-created problems, reach for the manual again. I hate to keep repeating that advice, but most times it's the user not the product who is doing something wrong—the wrong command, the wrong sequence, the wrong peripheral connected. Check your manual (printer, disk drive, software) for a troubleshooting appendix. If it has one, chances are it covers the problem you have encountered.

9. When all else fails—contact the manufacturer. Most have technicians employed specifically to help users of their products. Most software manuals will list the proper number to call for support.

10. If you can't get help directly from the manufacturer, try a local user's group. Most will have members more than happy to help a fellow computer user. A list of Commodore user groups appears each month in this magazine.

BY TIM JONES

AmigaBASIC Tutorial

Part 1: Screens

This month we are beginning a new series on AmigaBASIC. A short program demonstrates difficult areas of AmigaBASIC, offering both tips on confusing areas and tricks to make your life easier. Rather than an article followed by a program, we have combined them for the sake of clarity.

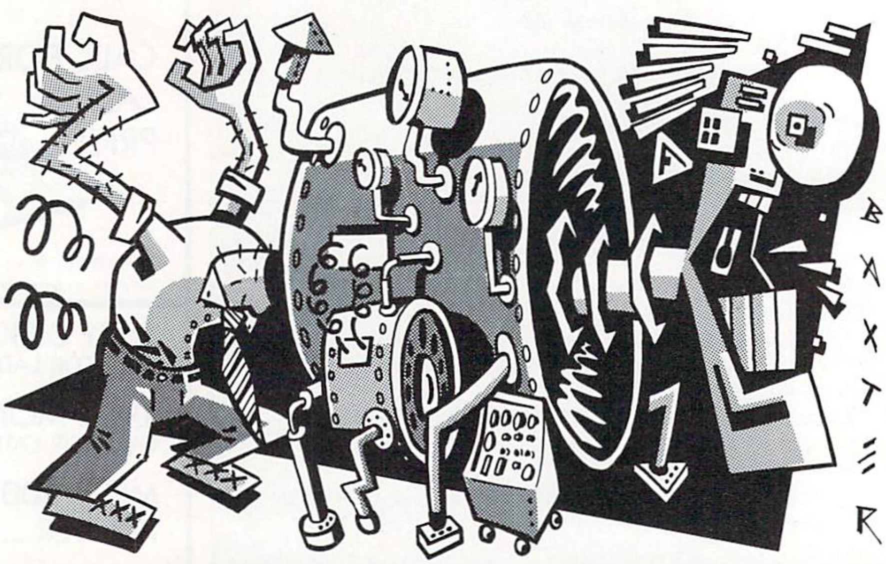
```
  ' Also includes WINDOW, PALETTE and RANDOMIZE
  ' In writing this tutorial, I am attempting to cover the AMIGA-
  ' specific routines, not BASIC. There are many good books
  ' available on BASIC.
  ' The following is an example of how to
  ' program Screens in Amiga (MS) BASIC
MENU OFF
  ' MENUS will be covered in installment #2.
DefineScreen: ' Labels are just to let you know what the sections do
SCREEN 1,320,200,5,1
  ' The above entry defines SCREEN #1 as being low-resolution
  ' (320x200) pixels, to allow 32 colors ( 2 ↑ 5 = 32 ) and the
  ' 1 at the end defines the screen mode ( 1-4 ). The 1 indicates
  ' low resolution, non-interlaced output.
  ' Please keep in mind, with a screen depth of 5, you have eaten
  ' up 64K of memory. Now, if you open a window to the screen, it
  ' will use a minimum of 1K (no gadgets or title) to an
  ' additional 64K, if you specify a type which includes 16
  ' (SMART—REFRESH), or 68K, if you shoot for a type 31
  ' (everything, including the ANCHOVIES!). (These numbers have
  ' been approximated using the FRE() call.)
DefineWindow:   ' Now, we open a window to see the results of our
  ' SCREEN.
  Title$ = "SCREEN/WINDOW     Tim Jones              "
  ' By placing your title in a string variable, it's easier
  ' to change as the need arises.
WINDOW 2,Title$,(0,0)-(268,98),31,1
  ' This entry defines WINDOW #2 (we don't want to use the BASIC
  ' WINDOW, which is #1 [See below]) with the title 'Title$'. It
  ' opens with a starting location of 10,35 (upper left-hand
  ' corner) and an ending location of 268,98 (lower right-hand
  ' corner). One special note about actual window size versus
  ' screen defined size; In high-res, non-interlaced mode, max
  ' window size is 617 x 186. In low-res, non-interlaced mode, max
  ' WINDOW size is 297 x 186. These sizes assume that the resize
  ' gadget flag has been set (bit 0). If not, then add 14 to the
  ' X values for 631 or 311.
  ' Be sure to keep this in mind when you start to set up your
  ' window displays.
  ' The 31 means that the following options are allowed:
  ' Size can be changed with the sizing gadged     — 1
  ' It can be moved using the Title (drag) bar     — 2
  ' Front to Back arrangement is active            — 4
  ' It can be closed using the CLOSE gadget        — 8
  ' Window is reprinted after being changed        — 16
                                          TOTAL — 31
  ' This window CHEWS up memory. If you don't have the extra
  ' 256K, it WILL crash your system as I don't do a memory
  ' check first.
  ' Concerning the selection of WINDOW 2 vice WINDOW 1 - When
  ' you use WINDOW 1 as your window, you place BASIC into a
  ' no-window-for-itself mode. This means that you must reset
  ' the BASIC default when exiting or you will bomb out BASIC.
  ' Here is what I do:
  '       WINDOW CLOSE 1
  '       WINDOW 1,"Basic",(0,0)-(617,186),31,-1
  ' The -1 sets the window to use the Workbench SCREEN.
  ' This resets the window to the BASIC default and keeps things
  ' on an even keel (especially the user!).
  ' One additional comment on using WINDOW 1, if you use
  ' ON ERROR GOTO in your program, WINDOW 1 must be an active
  ' part of your program or BASIC will shut down ALL of your
  ' screens and windows and make WINDOW 1 the active window
  ' to report to.
DefineColors:   ' Let's make things colorful
  PALETTE 0,0,0,0   ' This is to give us a Known color as the
                    ' background
  RANDOMIZE TIMER ' seed the RND function with the current timer
                    ' setting
 FOR ii = 1 TO 31  ' We've already defined  PALETTE 0 (Background)
   PALETTE ii,RND,RND,RND
   FOR Delay = 1 TO INT(RND * 10) : NEXT Delay
 NEXT ii
  ' I didn't want to get too picky with the color selections.
  ' Hopefully, the background won't be too ridiculous.
  ' The syntax for the PALETTE command is as follows:
  '    PALETTE #,R,G,B
  '    where # is the color # (0-31)
  '    and R,G,B are the Red-Green-Blue levels (decimal value
  '    between 0 and 1.0 is all off and one is full.)
  ' RND was used because it returns a value between 0 and 1
SendOutput:   ' Now we put information into the window
 WINDOW OUTPUT 2   ' Tell BASIC to send all print statements to
```

```
                    window #2'
 COLOR 3,0
 LOCATE 3,1 : PRINT "Now, use the mouse to make"
 COLOR 7,0
 PRINT "changes to the Window."
 COLOR 4,0
 PRINT "Hit the CLOSE Gadget to END!"
 COLOR 6,0
 PRINT "Notice that we opened the window"
 PRINT "with an ending coordinate of"
 PRINT "268,98. The numbers DON'T always"
 PRINT "match."
  ' The data is printed in our newly created window.
WaitLoop:    ' Let's give you some time to play with the window.
 WHILE WINDOW (7) <7
 COLOR 2,0 : LOCATE 1,1 : PRINT WINDOW(2); "Pixels
            wide,";WINDOW(3);
 PRINT "Pixels high.    "
  ' By placing this inside of the WHILE-WEND loop, we keep the
  ' numbers current.
 WEND
  ' This just waits for the user to close the window. If the
  ' window is open, WINDOW(7) returns a non-zero value and the
  ' WHILE-WEND loop repeats forever.
  ' The other WINDOW(X) commands are:
  ' 0 -> Returns the ID of the currently SELECTED window.
  ' 1 -> Returns the ID of the current OUTPUT window. This isn't
  '        necessarily the currently selected window. I would use
  '        WINDOW(0) to find out which window the user has
  '        selected, by monitoring the MOUSE(0) for a value of 1
  '        ( to be covered in another installment ), and then
  '        change the value of my WINDOW OUTPUT statement at the
  '        best time (i.e., not in the middle of printing
  '        something) to that new window.
  ' 2 -> Returns the WIDTH of the current OUTPUT window.
  ' 3 -> Returns the HEIGHT of the current OUTPUT window.
  ' 4 -> Returns the X COORDINATE in the current window where the
  '        NEXT CHARACTER will be drawn.
  ' 5 -> Returns the Y COORDINATE in the current window where the
  '        NEXT CHARACTER will be drawn.
  ' 6 -> Returns the MAXIMUM legal color for the current OUTPUT
  '        window. (i.e., SCREEN DEPTH of 4 will place a 15 in
  '        WINDOW(6))
  ' 7 -> Points to the INTUITION WINDOW record for the current
  '        OUTPUT window. If a 0 is present in WINDOW(7), it has
  '        been closed and another window should now be the
  '        CURRENT window.
  ' 8 -> Points to the RASTPORT record for the current OUTPUT
  '        window. This value is the pointer to the memory address
  '        of the window's RASTPORT. For more information, see the
  '        Intuition Reference Manual.
 CleanUpAndEnd:    ' Okay, now let's close things up and exit
WINDOW CLOSE 2
SCREEN CLOSE 1
' Always close ALL WINDOWS first and finally, the SCREEN.
STOP
  ' This file is the first of the tutorials series. This series is
  ' being developed, in what I consider, a logical flow pattern.
  ' If you insure that you understand what is presented in one
  ' tutorial before you proceed to the next, your confusion level
  ' should remain low. I hope that the information presented
  ' here has aided you in some way.
  ' If you have any comments or corrections, I can be contacted
  ' through People Link as AmSoft 1.
  ' If you like to call Amiga BBS's, I can also be reached at:
  '        Wonderland BBS    (617)-665-3796
  '        ZeitGeist BBS     (516)-679-3105
```

C

BY JERRY FITZPATRICK

Amiga Fractal Generator



Create multicolored Mandelbrot fractals with this AmigaBASIC program.

Many multicolored Mandelbrot fractals can easily be created with this AmigaBASIC program using menus, windows, disk I/O, and mouse commands. The program was adapted from an algorithm described by A. K. Dewdney in *Scientific American* magazine, August 1985.

Fractals—geometric forms having fractional dimensions—have gained quite a bit of popularity lately through their use in computer animations and simulations. There are many ways of generating fractals, but here we use a formula employing complex numbers. Complex numbers are used extensively in mathematics and engineering. Each number is composed of a real part and an imaginary part. It's not necessary, however, to understand the details of these numbers in order to operate the program.

Each point inside the ViewScreen where the fractals are plotted corresponds to a pair of real and imaginary coordinates. For each one, the fractal formula is applied iteratively until certain conditions are met. Such processes often lead to mathematical instabilities for a range of numbers. Graphing these unstable regions can produce remarkably intricate and striking scenes. Many such patterns can be generated and stored on your disk for future reference or exploration.

Program Controls

Once you've typed in the program and saved it, you're ready for testing. The program has five commands: New, Save, Restore, Magnify and Quit. These controls are listed in the Selections menu. Note that BASIC menus Edit, Run and Windows are still in place and operable.

Create your first fractal picture by selecting New. An extra will appear temporarily, asking you to enter the upper and lower boundaries of the real (X) and imaginary (Y) axes. Diagrams are displayed in the ViewScreen with real coordinates increasing from left to right, and imaginary coordinates increasing from bottom to top.

A good chance of starting coordinates is real (-2.0 to $+0.75$) and imaginary (-1.25 to $+1.25$). Be prepared for a bit of a wait once you begin. Even with the Amiga's computing power, it can take one to two hours to finish because of the large number of calculations required.

Once your fractal picture is finished, you can explore it using the Magnify command. After selecting Magnify, just position the pointer over a part of the picture you find intriguing and clock the left mouse button. The pointer coordinates are then calculated by the program and that small section is expanded by a factor of ten.

After a session of fractal exploration, you should select Quit rather than AmigaBASIC Stop or CTRL-C. The Quit command lets the program exit gracefully by closing all files, putting away the windows and custom screen, and resetting the menu bar. *Warning: Once you start generating or magnifying a fractal display, you must wait for it to finish before Quit will work.*

About the Program

Refer to the program listing for a moment. At the beginning, a three-layer screen is created allowing eight different colors to be displayed. Following this, a new menu bar is set up replacing the BASIC Project list. Finally, the color registers are redefined and the program waits for your menu selection.

Subroutine NewPic is the workhorse of the program. It calculates the coordinates of each point in the display and applies the iterative formula until the proper conditions exist. Then the number of iterations (i%) is used to determine a color for the point. The colors are spread evenly over the range from 1 to 80. Thus, points with values between 20 and 29 are colored yellow, while values between 60 and 69 are colored violet. To highlight details within small areas, the program could be changed to store the iteration number for each point and later assigned colors based on the overall range of values in the display.

If you look closely at NewPic near label *plot*, you'll notice a small trick used in plotting the points. Because the Amiga monitor has pixels which are about twice as high as they are wide, a 100-by-100 pixel display would look squashed and unnatural. To compensate for this effect, the X axis was made 200 pixels wide, with every other point being plotted in the same color as the one preceding it.

Feel free to experiment with the program to add features of just familiarize yourself with AmigaBASIC. The most significant improvement you could make would be to rewrite the main generator loop in machine language, thus speeding up fractal generation. ■

Amiga Fractal Generator

```
' *** Amiga Fractal Generator ***
'
' J. Fitzpatrick
' Adapted from algorithm in Scientific American, August 1985

' Define some constants
Xorg% = 110 : Yorg% = 50
Side = 100 : Iterations% = 80

SCREEN 2, 640,200,3,2 'Create new background screen

' create status window and view screen
WINDOW 4, "Status", (25,15) - (175,40),8,2
CLS : PRINT : PRINT " Idle. . ."
 X1% = Xorg% + (Side * 2) + 220
y1% = Yorg% + Side
WINDOW 2, "Fractal View Screen", (Xorg%,Yorg%) - (x1%,y1%),18,2

MENU 1,0,1, "Fractals" 'menu set-up
MENU 1,1,1, "NEW"
MENU 1,2,1, "Save"
MENU 1,3,1, "Restore"
MENU 1,4,1, "Magnify"
MENU 1,5,1, "Quit"

'Set up color registers
PALETTE 0, 0,0,0                'black
PALETTE 1, 1,1,1                'white
PALETTE 2, 1,0,0                'red
PALETTE 3, 1,1,0                'yellow
PALETTE 4, 0,1,0                'green
PALETTE 5, 0,1,1                'aqua
PALETTE 6, 0,0,1                'blue
PALETTE 7, 1,0,1                'violet

MOUSE OFF                       'disable mouse event
MENU ON                         'turn menu on and
ON MENU GOSUB mcheck            'wait for command

ON ERROR GOTO 500
100 SLEEP : GOTO 100

500 CLS : PRINT
    PRINT "error: possibly file name"
    GOSUB WrapUp
END

mcheck:     'perform selected command
  item = MENU (1)

  IF item = 1 THEN
    GOSUB GetCoord
    GOSUB NewPic
  END IF

  IF item = 2 THEN GOSUB SavePic
  IF item = 3 THEN GOSUB RestorePic
  IF item = 4 THEN GOSUB Zoom
  IF item = 5 THEN GOSUB WrapUp
RETURN

NewPic:     'make a new picture
  Delx = (Rmax - Rmin) / Side
  Dely = (Imax - Imin) / Side
  CLS
  GOSUB PrtCoord

  FOR y = 0 TO Side
    GOSUB PicLine
    FOR x = 0 TO Side
      i% = 0
      ZMAG = 0
      Creal = Delx * X  + Rmin
      Cimag = Imax - Dely * y
      Zreal = Creal
      Zimag = Cimag

      WHILE (ZMAG < 2 AND i% < Iterations%)
        GOSUB CalcMag
        GOSUB CalcSqr
        Zreal = ZSreal + Creal
        Zimag = ZSimag + Cimag
        i% = i% + 1
      WEND

      GOSUB Plottt
    NEXT
  NEXT

  GOSUB Done
RETURN

GetCoord:
  WINDOW 3, " ",(0,0)-(375,75),0,2
  CLS : PRINT

  info 1:
    PRINT
    PRINT " REAL AXIS COORDINATES: " : PRINT
    INPUT "         Lower bound, Upper bound", Rmin, Rmax
    If Rmax < = Rmin GOTO info 1
    If Rmax > 2 OR Rmin < -2 GOTO info 1

  CLS : PRINT

  info2:
    PRINT
    PRINT " IMAGINARY AXIS COORDINATES: " : PRINT
    INPUT "         Lower bound, Upper bound"; Imin, Imax
    IF Imax <= Imin GOTO info2
    IF Imax > 2 OR Rmin < -2 GOTO info2

  WINDOW CLOSE 3
RETURN

Prt Coord:      'print coordinates in window
  PRINT : PRINT : PRINT
  PRINT TAB (30); "Real Coordinates:"
  PRINT TAB (31); Rmin; " to "; Rmax
  PRINT
  PRINT TAB (30); "Imag Coordinates:"
  PRINT TAB (31); Imin; " to "; Imax
RETURN

CalcMag:        'calculate magnitude of z
  t1 = Zreal * Zreal
  t2 = Zimag * Zimag
  ZMAG = SQR (t1 +t2)
RETURN
```

```
CalcSqr:      'calculate z squared
  ZSreal = t1 - t2
  Zsimag = 2 * Zreal * Zimag
RETURN

Plottt:       'plot the point
  IF i% > 39 GOTO bin2

  id% = 1
  IF i% >  9 THEN id% = 2
  IF i% > 19 THEN id% = 3
  IF i% > 29 THEN id% = 4
  GOTO plot

bin2:
  id% = 5
  IF i% > 49 THEN id% = 6
  IF i% > 59 THEN id% = 7
  IF i% > 69 THEN id% = 0

plot:
  PSET (x+x,y),id%
  PSET (x+x+1,y),id%
RETURN

SavePic:      'save picture to disk
  WINDOW 3," ",(400,25) — (620,50),2,2
  PRINT : INPUT " File name"; f$
  WINDOW CLOSE 3
  GOSUB Working
  OPEN f$ FOR OUTPUT AS #5
  WRITE #5, Rmax,Rmin,Imax,Imin

  FOR y = 0 To Side
    FOR x = 0 To Side
      id% = POINT (x+x,y)
      WRITE #5, id%
    NEXT
  NEXT

CLOSE #5
GOSUB Done
RETURN

RestorePic:   'get picture from disk
  WINDOW 3," ",(400,25) — (620,50),2,2
  PRINT : INPUT " File name"; f$
  WINDOW CLOSE 3
  OPEN f$ FOR INPUT AS #5
  INPUT #5, Rmax,Rmin,Imax,Imin
  CLS : GOSUB PrtCoord

 FOR  y = 0 To Side
    GOSUB PicLine
    FOR x = 0 To Side
      INPUT #5,id%
      PSET (x+x,y),id%
      PSET (x+x+l,y),id%
    NEXT
  NEXT

  CLOSE #5
  GOSUB Done
RETURN

Zoom:       'magnify a spot
  WINDOW 3," ",(400,25) — (620,60),2,2

PRINT : PRINT " Move mouse to position. . ."
PRINT " . . .then click left button."

oldm = mouse(0)       'throw away prior mouse positions

MOUSE ON
WHILE MOUSE(0) <> 1 : WEND 'wait for click
Zx = MOUSE(5) : Zy = MOUSE(6) 'get coordinates
st = WINDOW(0)

IF st <> 2 OR Zx > 200 OR Zy > 100 THEN
  WINDOW CLOSE 3
  MOUSE OFF
  RETURN
END IF

Zx = Zx / 2
Delx = (Rmax − Rmin) / Side
Dely = (Imax − Imin) / Side
Freal = Delx * Zn + Rmin                'where is point?
Fimag = Imax − Dely * Zy
Dx = (Rmax − Rmin) / 20                 'calc. square around point
Dy = (Imax − Imin) / 20
Rmax = Freal + Dx                       'set new boundaries
Rmin = Freal − Dx
Imax = Fimag + Dy
Imin = Fimag − Dy

WINDOW CLOSE 3               'close temp window
GOSUB NewPic                 'begin with new picture
MOUSE OFF
RETURN

Working:      'working status
  WINDOW OUTPUT 4
  CLS : PRINT
  PRINT " Working. . ."
  WINDOW OUTPUT 2
RETURN

Done:      'done status
  WINDOW OUTPUT 4
  CLS : PRINT
  PRINT " Done. . ."
  WINDOW OUTPUT 2
RETURN

PicLine:      'picture line
  WINDOW OUTPUT 4
  CLS : PRINT
  PRINT " Line "; y
  WINDOW OUTPUT 2
RETURN

WrapUp:      'close windows, clean up
  CLOSE #5
  WINDOW CLOSE 2
  WINDOW CLOSE 3
  WINDOW CLOSE 4
  MENU RESET
  SCREEN CLOSE 2
  STOP
RETURN
```

END

BY SUZANNE McCOACH AND DAN SHEIN

Connect!

A Guide to Telecommunications Literacy

Become an on-line expert in this ongoing telecommunications tutorial.



The basic items you need to telecommunicate are a computer, modem, phone line and telecommunications software. We will cover each one of these in detail.

The first item you need is the computer. The computer will be used to run the software, and is also the point from which you conduct your side of the communication.

You can use any Commodore computer, except the Commodore 16, which was not designed with a user port. The user port is needed for connection of a modem to the computer.

The second item you need is the modem. The modem takes the electrical signals in your computer and converts them into a series of audio tones (beeps) that can be sent through the telephone line. It also takes the tones sent to you and converts them from an audio tone into an electrical signal that your computer can understand.

We will only concentrate on Commodore modems in this series of articles, but there are many other companies who make modems for Commodore computers. The two models currently still being produced by Commodore are the second version of the 1660/Modem 300 and the 1670/Modem 1200.

One of the things you need to know before you can connect a modem is what type of dialing your phone system uses. A call to your local telephone company can tell you if you are unsure. There are two types: tone and pulse. Pulse simulates the rotary dial of a phone and tone dialing, the newer form, is done through a series of tones. These are the sounds you hear when you press the buttons on a touch-tone phone. Generally, tone dialing is faster than pulse. This is because pulse dialing uses a series of relays to perform the same task as one tone in tone dialing. Tone lines can be used for pulse dialing, but pulse lines cannot be used for tone dialing.

Another thing to look at is the type of connectors your phone uses. All Commodore modems use the modular-type of connectors (RJ11C). If you do not have modular connectors, or are not sure what you have, you should again contact your local phone company to find out what type(s) of jacks you have or will need. Your local phone company should be willing to help you with obtaining this information and/or the installation of jacks, if needed. If you have the older four-prong style of jack, there are adaptors available at radio and electronics stores for conversion to the required modular style.

In addition to the 1670 and second version 1660 models, Commodore has produced three other models of modems that you may still find available at some locations. These are the 1600/VICModem, the 1650/AutoModem and the first version of the 1660/Modem 300.

There are some major differences between these modems. The 1600/VICModem requires you to dial the number you want to call, listen for a high pitched tone, and upon hearing the tone remove the cord from the telephone's handset and plug the cable into a jack at the rear of the VICModem. Of course, since this model requires the removal of the handset from the phone cord, only phones with modular handsets can be used. Phone models that have the dialer (push buttons or rotary) in the handset will not work with the VICModem.

The 1650/AutoModem connects directly to the modular connector where your phone is connected. Simply unplug the phone from the jack and plug the cable from the modem into the jack. Now plug the cable from your phone into the modem; there is an additional jack provided for this. This is known as a direct-connect modem. The 1660 and 1670 are also direct-connect modems.

The AutoModem has auto-answer and auto-dial. Auto-answer means that the modem can answer the phone if it rings. Auto-dial means that the telecommunications software will dial the number for you automatically.

The first version 1660/Modem 300 offered you the option of tone or pulse dialing. This model does not offer carrier detection. Carrier detection is needed if you want to use the Modem 300 to run a bulletin board. Please see the sidebar for more information. For a full comparison of features available on Commodore modems, along with what computer model the modems are compatible with, see the chart. More in-depth installation instructions are covered in the manual included with each modem.

The third item you need is a phone line. Most home users have only used the phone line for voice calls. However, this same line can be used for your telecommunications calls. No special phone line or equipment is required. When you use your phone line for a telecommunications call, the phone company treats your call like just like a voice call. This means that there are no extra fees for using a modem. If the number you are calling is a long distance call, then the same rates (billing costs) apply as if it was a voice call.

No one can dial out or call in when

TELECOMMUNICATIONS/CONNECT!

	1600 VICmodem	1650 AutoModem	1660 Modem/300 Version 1	1660 Modem/300 Version 2	1670 Modem/1200
Communication Standard	Bell 103	Bell 103	Bell 103	Bell 103	Bell 103 Bell 212A
Baud Rate	0-300	0-300	0-300	0-300	0-1200
Duplexing	Full	Full/Half	Full	Full	Full
Auto-Answer	No	Yes	No	Yes	Yes
Auto-Dial	No	Yes	Yes	Yes	Yes
Tone Dialing	N/A	No	Yes	Yes	Yes
Pulse Dialing	N/A	Yes	Yes	Yes	Yes
Computer Compatibility	VIC 20 C64 C128 SX-64	VIC 20 C64 C128	VIC 20 C64 C128 SX-64 Plus/4	VIC 20 C64 C128 SX-64 Plus/4*	VIC 20 C64 C128 SX-64 Plus/4*
Incl. Software Capability	VIC 20 C64 C128**	VIC 20 C64 C128**	VIC 20 C64 C128** Plus/4	C64 C128	C64 C128

* *Please see sidebar for further details*
** *Operates in 64-mode only*

you're using the phone line for a telecommunications call. If someone picks up an extension phone while you are making a telecommunications call, they will hear a series of beeps and tones or a lot of static.

The final item you need is telecommunications software. Telecommunications software come in all sizes and shapes. You can buy a commercial program, get a public domain program from a friend or user's group, type one in from a magazine, or write your own. All Commodore modems have a telecommunications program included with them at no additional cost.

The two current modems include a disk with several telecommunications programs, including VT-100 and VT-52 emulators, *Common Sense* telecommunications software and QuantumLink software. An emulator is a program that is designed to act like (emulate) a specific type of hardware terminal.

Most systems will require the use of a standard telecommunications program like *Common Sense. Common Sense* is a powerful terminal program that has options for all users. *Common Sense* is certainly not a stripped-down, no frills telecommunications program, and is what we will be using throughout this series. QuantumLink is a commercial information service.

Feel free to send any questions you may have with telecommunicating to us at Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380 ATTN: Communications Dept/Telecommunications Group. Of course, we will not be able to answer each letter personally, but we will be printing the most frequently asked questions with the answers in upcoming columns.

Suzanne McCoach is Telecommunications Manager at Commodore. Dan Schein is Network Coordinator.

Plus/4 and VIC 20 Owners



The user port on the Plus/4 is not the same as the user port on the VIC 20, C64 and C128, but the Commodore 1660 and 1670 modems will work with the Plus/4. The first version 1660/Modem 300 will work right out of the box. The second version 1660/Modem 300 needs to be modified for use on the Plus/4. If you look at the picture of the second version of the 1660/Modem 300, you will notice an arrow. This is the exposed solder joint that must be cut in order to use it on the Plus/4. We suggest that you send your modem and a copy of the dated sales receipt to our service department, so they can perform the required modification and return the unit to you. This modification must be done at the factory due to Federal Communications Commission regulations.

To use the 1670, all you have to do is flip switch number three "UP." This switch will be found on the rear of the modem.

If you have a Plus/4 or VIC 20, then the software supplied with the 1670/Modem 1200 and second version 1660/Modem 300 will not work with your computer. If you send the software included with your Commodore modem back to our service department along with a copy of your dated sales receipt and a letter of request, you will be returned a program that is designed to run on your model of computer.

The address for Commodore Service is Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380, Attn: Service Dept.

Please note: The above-listed services are both performed free if the modem is inside your 90-day warranty period. If the modem is outside the 90-day warranty period, we suggest you contact the service department directly.

BY PAUL MONTOGNESE

Approximater

for the Commodore 64

You have just applied the final touches to your states and capitals program. You have very cleverly used sprites and sound to liven things up and make the learning process almost painless. Surely, your child will have less trouble learning this material than you did.

So now the only thing left is to sit little Suzy down at the computer for the ultimate test. The program starts and asks for the name of the state for which ALBANY is the capital. No problem, as Suzy keys NEW YORK. The next capital indicated is SPRINGFIELD, so Suzy keys ILINOIS and presses the RETURN key with a confident look on her face.

But a sad face sprite appears on the screen, along with a message that the correct answer is ILLINOIS, not ILINOIS. Little Suzy very innocently asks if your well-crafted program may have a bug or two that needs to be worked out. You reply that no, there is no bug. It's just that computers are very precise and recognize only equal or unequal conditions, and ILINOIS is simply not the same as ILLINOIS.

That's true, she says, but the teachers mark off only a point or two at most for incorrect spelling. You know that she's right, but what do you do now? How do you explain that the fancy computer gear you have is not capable of recognizing something that is almost correct? You don't have to! Just add Approximater to your program!

Approximater is a machine-language subroutine that compares two strings. When control is returned to your BASIC program, the variable PC% is set to a value from 0-100, with 100 representing a perfect character for character match. Anything between these two extremes represents some degree of equality.

Approximater works by first comparing each character to the same relative character in the other string. If no match is found, then adjacent character positions are also checked. Matches on these adjacent characters are also recorded as hits. At the end a preliminary percentage is computed by the following formula: (H * 100) / C where H = the number of hits and C = the number of characters in the longest string.

The number of hits that occurred on adjacent characters is divided by two, rounded up, and subtracted from the preliminary percentage. Finally, the PC% variable is set to the result and control returned to BASIC.

Note that adjacent applies only to a character position in the other string one before or after that being matched. The logic in the code allows for a given character in either string to be included in only one match, so there is no way to trick it into giving a high score.

The PC% variable setting is automatic. You don't have to reference it anywhere in your BASIC program other than to check its value after the call to Approximater.

All of this happens at machine-language speeds so there are no noticeable delays. The general format of the call to Approximater is as follows:

SYS 52821,S_1 ,S_2

S_1 and S_2 are strings that can be expressed as a literal, an expression, a simple variable, or an array variable as in the following examples:

SYS 52821,"LITERAL",A$
SYS 52821,"EXPRESSION"+A$,B$
SYS 52821,A$,B$(N)

A "TYPE MISMATCH" error occurs if either of the two arguments are something other than a string value.

Lines 10-60 poke the machine language into place and then input two strings that you supply, calls Approximater, and prints the PC% variable. Just key a slash (/) to end the process. Use this to experiment with various strings values.

To add Approximater to your program, just add the data statements and poke them in 52821 through 52991 during initialization. After that you can invoke Approximater by way of the preceding examples.

The list below is a sampler showing the results of calling Approximater with various sets of string values.

S_1	S_2	PC%
ILINOIS	ILLINOIS	84
NEW YORK	NEWYORK	85
HABERDASHERY	HABERDASHER	91
APPLE	APPLES	83
FOOT	FEET	50
TWINS	TIWNS	99
ORANGES	ORANGES	100
SERIAL	CERIAL	66

Approximater is non-destructive in that the two string arguments passed to it are not altered in any way. It resides in the high end of free memory, 52821 through 53247. The last 256 bytes are used as a work area so only 52821 through 52991 need to be poked. Most BASIC compilers will not properly handle SYS calls like that required by Approximater. The normal way around this restriction is to tell the compiler to pass the statement through to BASIC for execution. With BLITZ! just precede the statement with two colons like this:

150 : :SYS52821,S_1 ,S_2

Approximater is ideally suited for establishing various levels in word response programs. At the easiest level the program could require a score of 65 or better to be correct, 75 or better for intermediate, and 85 or better for advanced.

If you insist on using an integer variable other than PC%, then poke its ASCII values + 128 into 52956 and 52958. For example, this would set Approximater to return its score into XY%.

POKE52956,ASC("X")+128:
POKE52958,ASC("Y")+128

For a single character integer variable, change the second poke to

POKE52958,128

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Approximater

```
10 PRINT TAB(6)"2 SECONDS FOR ML
   SETUP.....":ML=52821'DKGI
20 FOR I=ML TO 52991:READ A:POKE I,A
```

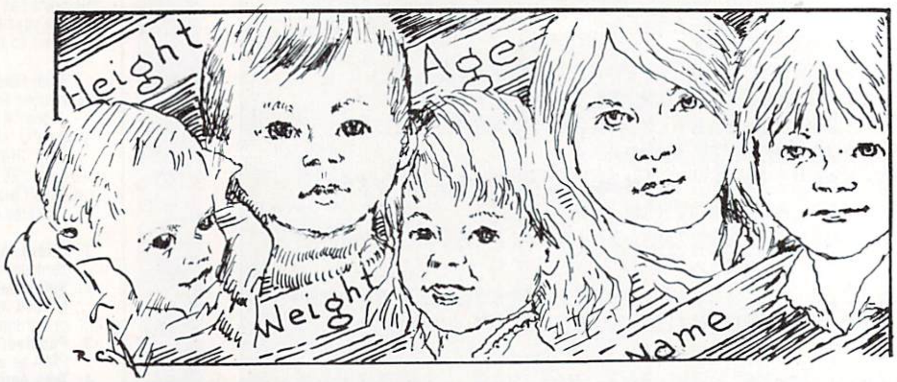
APPROXIMATER

```
   :NEXT'GPIF
30 POKE 53280,.:POKE 53281,1
   :PRINT"[CLEAR,BLACK]"
   :PRINT TAB(10)"KEY SLASH (/) TO
   END[DOWN]"'FUBM
40 A$="":B$="":INPUT "STRING 1";A$
   :IF A$="/"THEN END'HMQJ
50 INPUT "STRING 2";B$:IF B$="/"THEN
   END'FGMH
60 SYS ML,A$,B$:PRINT "[SPACE3]SCORE=
   [RED]"PC%"[DOWN,BLACK]"
   :GOTO 40'DPHJ
52821 DATA  32,243,206,240, 16,133,
      191'BAEH
52828 DATA 138,208,  1,136,202,142,
      143'BADO
52835 DATA 206,140,144,206, 32,243,
      206'BBBM
52842 DATA 240,110,133, 97,168,197,
      191'BBXK
52849 DATA 176,  2,165,191,133, 98,
      169'BYHR
52856 DATA   0,240,  3,136,177, 34,
      153'BWNO
52863 DATA   0,207,152,208,247,162,
        4'BXOM
52870 DATA 149, 98,202,208,251,232,
      138'BBVL
52877 DATA 168,189,255,255,217,255,
      206'BCJS
52884 DATA 240, 15,136,217,255,206,
      240'BBHQ
52891 DATA   7,200,200,217,255,206,
      208'BACO
52898 DATA   9,230,102,230, 99,169,
        0'BWTU
52905 DATA 153,255,206,228,191,208,
      219'BCVK
52912 DATA 162,100, 24,165, 99,101,
      100'BAAI
52919 DATA 133,100,144,  2,230,101,
      202'BAGP
52926 DATA 208,242,202, 56,232,165,
      100'BBCN
52933 DATA 229, 98,133,100,176,247,
      198'BBHL
52940 DATA 101, 16,242,138,240,  8,
       70'BXLI
52947 DATA 102, 73,255,101,102, 73,
      255'BADQ
52954 DATA  72,169,208,162,195,133,
       69'BAHO
52961 DATA 134, 70, 32,231,176,169,
        0'BXRL
52968 DATA 160,  2,145, 95,104,200,
      145'BYDT
52975 DATA  95, 76,248,168, 32,253,
      174'BYLR
52982 DATA  32,158,173, 32,163,182,
      201'BAKP
52989 DATA   0, 96,  0'BGTS
```

BY D.W. SAMPSON

Children

for the Commodore 64 with a 1526 or MPS-802



In speaking to my local police department, I realized the importance of keeping up-to-date information on children. To keep this information updated cannot be stressed enough.

Create a form to record information on your child.

This program provides forms for all the vital information on your child. The margins are set to allow you to place the forms in three-ring binders.

Fill out a complete set of information sheets for each one of your children. If you have none of your own, you may want to give copies to relatives or friends.

When updating the information, do not throw away the old forms. Information contained on them may be useful too.

Please, when filling out the forms, sit down and talk with your child. The majority of the information required must come from them. Make them aware of what you are doing and why.

The program was designed for use on the Commodore 1526 or MPS-802 printer. You may have to change the CHR$ for use on your printer. Consult your printer manual on this. ■

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Children

```
1 PRINT"[CLEAR,RVS,WHITE,RVOFF]"
  :POKE 53280,11:POKE 53281,12'DSEF
2 S$="[SPACE11]----------------------
  -----------------------------------"
  'BCCM
20 PRINT"[DOWN2,RIGHT13,SHFT S]
   CHILDREN [SHFT S]"'BAIE
30 PRINT"[DOWN2,RIGHT2]
   PLEASE TURN ON YOUR PRINTER,
    PRESS THE[SPACE4]ARROW UP ([^]
   ) AND ";'BBXP
40 PRINT"[RIGHT]RETURN TO START
   [SPACE3]PROGRAM."'BASH
50 PRINT"[DOWN4,RIGHT2]
   PRINT OUT AS MANY FORMS AS YOU
   NEED."'BAUL
60 PRINT"[DOWN4,RIGHT2]
   PLEASE UPDATE EVERY THREE (3)
   MONTHS[SPACE4](OR SOONER)."'BAIQ
70 PRINT" ":INPUT DA$'CEHF
80 IF DA$="[^]"GOTO 100'DGTH
90 IF DA$<>"[^]"GOTO 70'EFFI
100 OPEN 4,4,0'BFRV
110 PRINT#4,CHR$(147)'CHVX
120 PRINT#4,CHR$(13)'CGPY
130 PRINT#4,SPC(10)"DATE
    :--------------"'CFJE
140 PRINT#4,'BCWY
145 PRINT#4,CHR$(13)'CGPG
150 PRINT#4,SPC(10)"NAME
    :-------------------------------
    ----------------"'CFOM
160 PRINT#4,'BCWB
170 PRINT#4,SPC(10)"ADDRESS
    :-------------------------------
    -------------"'CFIO
175 PRINT#4,'BCWH
180 PRINT#4,SPC(10)"CITY
    :-------------------- STATE
    :------------ZIP:-----"'CFMQ
185 PRINT#4,'BCWI
190 PRINT#4,SPC(10)"DATE OF BIRTH
    :-----------------"'CFGM
195 PRINT#4,'BCWJ
200 PRINT#4,SPC(10)"PLACE OF BIRTH
    :-------------------------------
    ------"'CFUI
205 PRINT#4,'BCWB
210 PRINT#4,SPC(10)"NAME AND ADDRESS
    OF PRESENT SCHOOL:--------------
    --";'CGYL
215 PRINT#4,'BCWC
220 TT=2:GOSUB 1500'CIZB
235 PRINT#4,'BCWE
240 PRINT#4,SPC(10)"TEACHERS NAME
    :-------------------------------
    -------"'CFBN
245 PRINT#4,'BCWF
250 PRINT#4,SPC(10)"GRADE
    :--------------------"'CFXI
255 PRINT#4,'BCWG
260 PRINT#4,CHR$(14)SPC(10)"GENERAL
    DESCRIPTION"CHR$(15)'ENAM
265 PRINT#4,CHR$(13)'CGPJ
270 PRINT#4,SPC(10)"SEX
    :-----------HEIGHT:-------------W
```

64 USERS ONLY/CHILDREN

```
    EIGHT:-----------"'CFMQ
275 PRINT#4,'BCWI
280 PRINT#4,SPC(10)"COLOR HAIR
    :-----------------EYES
    :-------------"'CFIQ
285 PRINT#4,'BCWJ
290 PRINT#4,SPC(10)"SCARS OR OTHER
    IDENTIFYING MARKS:"'CFKQ
292 TT=3:GOSUB 1500'CIAK
315 PRINT#4,'BCWD
330 PRINT#4,SPC(10)"PERSONAL HABITS
    :---------------------------------
    -----"'CFKN
332 TT=3:GOSUB 1500'CIAF
365 PRINT#4,CHR$(19)'CGVK
370 PRINT#4,CHR$(13)'CGPG
375 PRINT#4,SPC(10)"PAGE 2"'CFFM
380 PRINT#4,CHR$(147)'CHVH
385 PRINT#4,CHR$(14)SPC(15)"MEDICAL
    DATA"CHR$(15)'ENQS
390 PRINT#4,'BCWG
395 PRINT#4,SPC(10)"LIST MEDICAL
    PROBLEMS IF ANY:"'CFBV
400 TT=4:GOSUB 1500'CIBB
435 PRINT#4,'BCWG
440 PRINT#4,SPC(10)"MEDICATIONS
    :---------------------------------
    ---------"'CFBO
445 TT=2:GOSUB 1500'CIZK
465 PRINT#4,'BCWJ
470 PRINT#4,SPC(10)"ALLERGIES
    :---------------------------------
    -----------"'CFOR
475 TT=2:GOSUB 1500'CIZN
495 PRINT#4,'BCWM
500 PRINT#4,SPC(10)"FEARS
    :---------------------------------
    ---------------"'CFYL
505 TT=2:GOSUB 1500'CIZH
525 PRINT#4,'BCWG
530 PRINT#4,SPC(10)"FAVORITE FOODS
    :---------------------------------
    ------"'CFMP
535 TT=2:GOSUB 1500'CIZK
555 PRINT#4,'BCWJ
560 PRINT#4,SPC(10)"FOOD DISLIKES
    :---------------------------------
    -------"'CFRS
565 TT=2:GOSUB 1500'CIZN
585 PRINT#4,'BCWM
590 PRINT#4,SPC(10)"NAME AND ADDRESS
    OF DOCTOR:-----------------------
    ---"'CFEV
595 TT=1:GOSUB 1500'CIYQ
605 PRINT#4,'BCWF
610 PRINT#4,SPC(10)"NAME AND ADDRESS
    OF ANY HOSPITAL ADMITTANCE:"'CFCO
615 TT=3:GOSUB 1500'CIAJ
645 PRINT#4,CHR$(19)'CGVL
650 PRINT#4,'BCWF
655 PRINT#4,CHR$(147)'CHVM
660 PRINT#4,'BCWG
665 PRINT#4,SPC(10)"PAGE 3"'CFGO
670 PRINT#4,CHR$(13)'CGPJ
675 PRINT#4,SPC(10)"NAMES,
    ADDRESSES AND PHONE NUMBERS OF
    THREE PLAYMATES";'CGFD
678 PRINT#4," OF CHILD:"'BCOS
680 PRINT#4,'BCWI
683 FOR X=1 TO 3'DDVN
685 PRINT#4,SPC(10)"NAME
    :---------------------------------
    ---------------"'CFOA
690 PRINT#4,'BCWJ
695 PRINT#4,SPC(10)"ADDRESS
    :---------------------------------
    -------------"'CFIB
700 PRINT#4,'BCWB
705 PRINT#4,SPC(10)"PHONE
    :---------------------------------
    ---------------"'CFIS
710 PRINT#4,'BCWC
715 NEXT'BAEH
720 PRINT#4,'BCWD
770 PRINT#4,CHR$(13)'CGPK
785 PRINT#4,SPC(10)"NAME,
    ADDRESSES AND PHONE NUMBERS OF 3
    RELATIVES ";'CGEE
790 PRINT#4,"KNOWN TO CHILD:"'BCTP
795 PRINT#4,'BCWP
797 FOR X=1 TO 3'DDVT
800 PRINT#4,SPC(10)"NAME
    :---------------------------------
    ---------------"'CFOO
805 PRINT#4,'BCWH
810 PRINT#4,SPC(10)"ADDRESS
    :---------------------------------
    -------------"'CFIP
815 PRINT#4,'BCWI
820 PRINT#4,SPC(10)"CITY
    :-------------------STATE
    :---------PHONE:-------"'CFVR
825 PRINT#4,'BCWJ
830 NEXT'BAEF
835 PRINT#4,'BCWK
900 PRINT#4,CHR$(19)'CGVF
905 PRINT#4,'BCWI
910 PRINT#4,CHR$(147)'CHVG
915 PRINT#4,SPC(10)"PAGE 4"'CFHM
920 PRINT#4,'BCWF
925 PRINT#4,SPC(10)"LIST PLACES THAT
    ARE KNOWN GEOGRAPHICLY TO THE
    CHILD:"'CFBB
930 FOR X=1 TO 20'DESI
935 PRINT#4,'BCWL
940 PRINT#4,S$'BEKI
945 NEXT'BAEM
955 PRINT#4,CHR$(19)'CGVP
960 PRINT#4,'BCWJ
965 PRINT#4,CHR$(147)'CHVQ
970 PRINT#4,SPC(10)"PAGE 5"'CFIN
975 PRINT#4,CHR$(13)'CGPR
985 PRINT#4,CHR$(14)SPC(10)"PHOTO
    :"CHR$(15)'ENLW
990 PRINT#4,'BCWM
```

```
995 PRINT#4,SPC(20)"[CMDR A,SPACE34,
    CMDR S]"'CFAY
1005 FOR G=1 TO 5'DDGA
1010 PRINT#4,'BCWT
1015 NEXT'BAEY
1020 PRINT#4,SPC(30)"[CMDR A,SPACE12,
     CMDR S]"'CFKA
1025 FOR H=1 TO 10'DEBC
1030 PRINT#4,'BCWV
1035 NEXT'BAEB
1040 PRINT#4,SPC(30)"[CMDR Z,SPACE12,
     CMDR X]"'CFWC
1050 FOR M=1 TO 5'DDMA
1055 PRINT#4,'BCWD
1060 NEXT'BAEY
1065 PRINT#4,SPC(20)"[CMDR Z,SPACE34,
     CMDR X]"'CFML
1075 PRINT#4,'BCWF
1080 PRINT#4,SPC(10)"DATE PHOTO WAS
     TAKEN:--------------------------
     -----"'CFHO
1085 PRINT#4,'BCWG
1090 PRINT#4,SPC(10)"WHERE WAS PHOTO
     TAKEN:--------------------------
     ----"'CFFP
1095 TT=1:GOSUB 1500'CIYK
1105 PRINT#4,'BCWY
1110 PRINT#4,SPC(10)"AGE OF CHILD
     WHEN PHOTO WAS TAKEN
     :------------------"'CFOJ
1115 PRINT#4,'BCWA
1120 PRINT#4,CHR$(19)'CGVX
1125 PRINT#4,'BCWB
1130 PRINT#4,CHR$(147)'CHVY
1135 PRINT#4,SPC(10)"PAGE 6"'CFJF
1140 PRINT#4,'BCWX
1145 PRINT#4,SPC(10)"LIST CHILDS
     FAVORITE TV PROGRAMS,
      AND TIMES AND ";'CGUS
1150 PRINT#4,"CHANNEL SHOWN:"'BCFD
1152 TT=7:GOSUB 1500'CIEE
1165 PRINT#4,'BCWF
1175 PRINT#4,SPC(10)"CHILDS RELIGOUS
     AFFILIATION:--------------------
     ----"'CFHU
1180 PRINT#4,'BCWC
1185 PRINT#4,SPC(10)"NAME AND
     LOCATION OF CHURCH
     :------------------------"'CFHU
1190 TT=1:GOSUB 1500'CIYG
1200 PRINT#4,'BCWU
1205 PRINT#4,SPC(10)"PASTORS NAME
     :-------------------------------
     --------"'CFUM
1210 PRINT#4,'BCWV
1215 PRINT#4,CHR$(19)'CGVD
1220 PRINT#4,'BCWW
1225 PRINT#4,CHR$(147)'CHVE
1230 PRINT#4,SPC(10)"PAGE 7"'CFKB
1235 PRINT#4,'BCWD
1240 PRINT#4,SPC(10)"FINGERPRINTS
     :"'CFKF
1245 PRINT#4,CHR$(13)'CGPG
1250 PRINT#4,SPC(10)"LEFT HAND:"'CFIE
1255 PRINT#4,'BCWF
1260 FOR X=1 TO 10'DERD
1265 PRINT#4,'BCWG
1270 NEXT'BAEC
1275 PRINT#4,SPC(10)"RIGHT HAND:"'CFLM
1280 FOR X=1 TO 10'DERF
1285 PRINT#4.'BCYI
1290 NEXT'BAEE
1295 PRINT#4,CHR$(19)'CGVL
1300 PRINT#4,'BCWV
1305 PRINT#4,CHR$(147)'CHVD
1310 PRINT#4,SPC(10)"PAGE 8"'CFLA
1315 PRINT#4,CHR$(13)'CGPE
1320 PRINT#4,SPC(10)"LIST ANY OTHER
     INFORMATION YOU THINK NECESSARY
     :"'CFTN
1330 FOR X=1 TO 25'DEXB
1335 PRINT#4,'BCWE
1340 PRINT#4,S$'BEKB
1345 NEXT'BAEF
1350 PRINT#4,CHR$(19)'CGVD
1355 CLOSE 4,4,0'BFSH
1360 END'BACC
1500 FOR XX=1 TO TT'DFUB
1510 PRINT#4,:PRINT#4,S$'CHKB
1520 NEXT:RETURN'CBXB
```

END

BY BENNETT COOKSON, JR.

The Personalizer
for the Commodore 64



How many times have you gotten a syntax error? Wouldn't it be better if the computer responded with something like "I don't quite understand what you were trying to say in line . . ." or maybe "That does not compute!"

The Personalizer changes error messages to anything you want. For example, instead of the usual ready prompt, I prefer "Bennett, I'm at your service!" It's a little more personal.

Although this program is mostly just for fun (imagine when your friend Joe comes by to do a little programming and your computer responds with "Come on Joe, get it right"), there is a practical side. You can change the "Redo from start" message to something you understand, like "Enter a number please."

Using the Personalizer

Since the program is listing out error messages, it will be hard to tell if you have an error in the program. So you can distinguish between a real error and the error message you are changing, each message is numbered from 1 to 35. Remember that message number 30 is the Ready prompt, so don't think the program is over. You will know when the program is over because the computer says "Program Over . . . Good Bye."

To change a message that has been listed, simply press the F7 key and type in the new message. It can be up to 80 characters long. The quote mark you see is to allow commas and colons with an INPUT statement.

Included in the miscellaneous messages is the ready prompt, which is number 30. Number 33 is "error" as in "syntax error" and is printed at the end of each error. Number 34 is "in" as in "syntax error in 10"

To save all of your new messages, simply type "RUN 2000" and save it as you normally would. Line 2030 changes some important pointers, so you must enter the four pokes printed on the screen by line 2000 or turn the computer off and then back on. Simply move the cursor to the first poke and hit return four times.

RUN 2000
SAVE"0:messages",8 for disk
SAVE"messages",1 for tape

To reload a set of messages, type

LOAD"messages",8,1 for disk
LOAD"messages",1,1 for tape
NEW
POKE 1,54

Don't forget the ",1" at the end. The NEW is to reset some important pointers. POKE 1,54 switches in the new messages.

You can run the program again and again to keep changing messages. Always allow the program to end (don't break out) so that certain pointers can be set.

The new messages will be there until you press RUN/STOP-RESTORE or the following poke.

POKE 1,55 regular messages
POKE 1,54 new messages back in

That way you can switch back and forth and really blow away your friends when they see how your computer calls you by name. (Be careful, the wrong number in location one could cause your computer to crash.)

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

The Personalizer

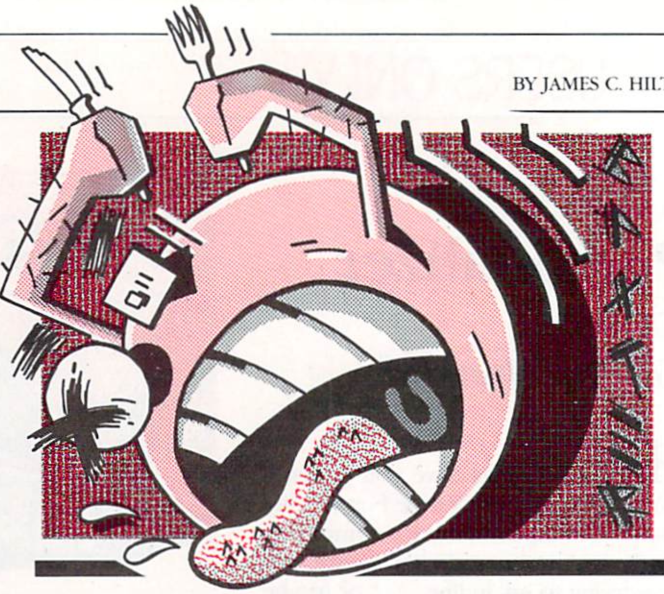
```
6 REM CHANGES ERROR MESSAGES'BUFK
7 DATA 42101,44277,43884,42086,
  48579'BEHL
8 FOR X=1 TO 5:READ V(X):NEXT'FJRL
10 IF PEEK(40964)=65 THEN 50'ELFB
20 FOR X=828 TO X+24:READ D:POKE X,D
   :NEXT'HOVF
22 SYS 828:REM MOVE BASIC ROM TO
   RAM'CVTH
25 DATA 169,0,133,251,169,160,133,
   252'BEDJ
26 DATA 160,0,162,32,177,251,145,251,
   200'BHMK
27 DATA 208,249,230,252,202,208,244,
   96'BFJL
30 POKE 1,PEEK(1) AND 254
   :POKE 40964,65:POKE 49153,192
   :POKE 49152,2'GKUJ
50 DEF FN H(DE)=INT(DE/256)'FMGG
52 DEF FN L(DN)=DN-FN H(DN)*256'GPNK
60 M=PEEK(49153)*256+PEEK(49152)'FSJJ
65 POKE 808,239 :REM DISABLE STOP
   KEY'CWLN
200 PRINT CHR$(147)'CFBX
205 PRINT"I WILL LIST ERROR
    MESSAGES"'BAFI
210 PRINT"PRESS F7 TO CHANGE
    MESSAGE"'BAJE
212 PRINT"PRESS F1 TO END
    PROGRAM"'BASF
215 PRINT"PRESS ANY OTHER KEY TO
    CONTINUE LISTING":PRINT:PRINT'DCIP
```

Continued on pg. 101

BY JAMES C. HILTY

Gobbler's Revenge

for the Commodore 64



A few years ago, computer games began featuring maze games like *Pacman* and *Munchman*. Since then, many little dot-eating creatures have graced the arcades and home video screens. But enough is enough—these little fellows are tired of eating power pills and being chased by ghosts and goblins!

Gobbler's Revenge puts you up against a Gobbler in a race to gather all of the power pellets and diamonds you can. After the musical title screen, a random playing field is drawn. You are the red figure at the upper right of the maze and the Gobbler is the yellow figure at the upper left.

The game starts when the Gobbler at the bottom of the screen starts spinning. Each power pellet is worth 10 points and each diamond is worth 100 points. Both your score and the Gobbler's score are displayed at the bottom of the screen.

The Gobbler has one big advantage: If he catches you, the game is over and the Gobbler receives 1,000 bonus points. If you can avoid him, the game ends when all of the power pellets and diamonds are gone.

At times the Gobbler can be difficult to beat. He roams the maze relentlessly, picking up power pellets and diamonds, all the while stalking you. You move your player with a joystick in port 1. You must try to get as many diamonds and pellets that you can, but you must keep an eye out where the Gobbler is, for he will trap you in the maze if you are not careful. Try to study the maze carefully as you play. Study the Gobbler as he moves and you will discover certain trends as he comes to intersections in the maze.

Gobbler's Revenge is written in BASIC, but several machine-language routines are used for speed. They are accessed with the SYS command. One routine instantly draws a new maze for each game. This enables replay options to be

These little dot-eating creatures are tired of being chased by ghosts and goblins—they want you to know what it's like!

instantaneous. The other machine-language routine is for the joystick movement of your player.

Your player and the Gobbler are character figures, while the spinning Gobbler at the bottom of the playing screen is a sprite, animated by poking different values into the sprite pointer. The title screen is made up of numerous sprites, animated in a similar manner. Lines 900-928 play the music from data statements as well as animate the sprites with the variable Q.

The Gobbler is pretty confident that he can beat you and achieve his revenge. But with some skill and some luck, there is always that chance that you can beat the Gobbler at his own game. After all, we should be able to outmaneuver a little creature that goes around eating dots. . . .

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Gobbler's Revenge

```
40 DEF FN A(J)=(J+2)+4*(J>1)'HNUH
50 V=53248:D=54272:GS=0:YS=0:Q=192
   :D$="[DOWN21]"'GEGN
60 DIM A(3):A(0)=2:A(1)=-80:A(2)=-2
   :A(3)=80'HFVM
100 PRINT"[CLEAR]":PRINT"[DOWN4]
   PLEASE WAIT....READING DATA"'CBME
110 READ N,DR:IF N=0 THEN 130'EKXA
120 GOTO 110'BDBX
130 FOR X=828 TO 973:READ A:POKE X,A
   :NEXT'GOYE
140 L=49152'BGDB
150 READ A:IF A=256 THEN 170'EJQE
160 POKE L,A:L=L+1:GOTO 150'ELIG
170 FOR X=12288 TO 12350:READ A
   :POKE X,A:NEXT'GSFJ
180 FOR X=12352 TO 12414:READ A
   :POKE X,A:NEXT'GSXK
190 FOR X=12416 TO 12478:READ A
   :POKE X,A:NEXT'GSJL
200 FOR X=12480 TO 12542:READ A
   :POKE X,A:NEXT'GSCD
210 FOR X=12544 TO 12606:READ A
   :POKE X,A:NEXT'GSEE
220 FOR X=12608 TO 12670:READ A
   :POKE X,A:NEXT'GSGF
225 GOSUB 950'BDRE
230 PRINT"[CLEAR]":POKE 53280,0
   :POKE 53281,0'DQOE
232 FOR I=0 TO 24:POKE D+I,0:NEXT'GKNG
234 N$="[SPACE4]G O B B L E R ' S
   [SPACE3]R E V E N G E"'BCLL
236 PRINT"[DOWN5]"'BAMF
237 PRINT"[CYAN]"'BAGH
238 FOR T=1 TO 37'DEWJ
239 PRINT RIGHT$(N$,T);"[UP]"'CHNL
240 FOR I=0 TO 50:NEXT I'EGKD
```

```
242 POKE D,150:POKE D+1,200:POKE D+5,8
    :POKE D+6,248:POKE D+24,15
    :POKE D+4,17'LMJQ
244 FOR I=0 TO 50:NEXT I'EGKH
246 POKE D+4,16'CFAI
252 NEXT T'BBND
254 POKE D+24,0'CFUH
255 PRINT"[DOWN7]"TAB(15)"[ORANGE]
    BY J.C.HILTY"'CDCL
260 GOSUB 900'BDMD
261 FOR T=0 TO 1000:NEXT'EHPG
262 POKE V+21,0'CFKG
264 PRINT"[CLEAR]":POKE 53281,0
    :POKE 53280,8'DQWL
300 SYS 49160'BFLX
302 A=1105:L=1141:G=42:P=28:CM=54272
    :J=2:H=90'HJYL
303 PRINT"[HOME,SPACE3,YELLOW]
    G O B B L E R ' S[SPACE3]
    R E V E N G E"'BASI
304 PRINT D$TAB(2)" [WHITE]
    GOBBLER SCORE[SPACE10]
    YOUR SCORE"'CECK
306 PRINT TAB(6)GS;"[SPACE19]"YS'CHXI
307 POKE V+23,0:POKE V+29,0
    :POKE V+0,174:POKE V+1,226:Q=192
    :POKE 2040,Q'KMJS
308 POKE V+21,1:POKE 1105,G
    :POKE 1105+CM,7:POKE 1141,P
    :POKE 1141+CM,10'INKS
309 POKE 1835,H:POKE 1835+CM,13
    :POKE 1857,H:POKE 1857+CM,13'GIJQ
310 POKE 1509,H:POKE 1509+CM,13
    :POKE 1599,H:POKE 1599+CM,13'GILI
311 POKE 1605,H:POKE 1605+CM,13
    :POKE 1113,H:POKE 1113+CM,13
    :POKE 1137,H'HPLL
312 POKE 1137+CM,13'CJTD
313 FOR T=0 TO 2000:NEXT
    :REM     MAIN LOOP'FQBI
314 Q=Q+1:IF Q=198 THEN Q=192'GMWI
315 POKE 2040,Q'BGRE
316 B=A+A(J)/2'DHDH
317 IF PEEK(B)=32 THEN POKE B,G
    :POKE B+CM,7:POKE A,32:A=B
    :J=FN A(J)'LDXS
318 IF PEEK(B)=46 THEN POKE B,G
    :POKE B+CM,7:POKE A,32:A=B
    :J=FN A(J):GOSUB 500'MHUU
319 IF PEEK(B)=90 THEN POKE B,G
    :POKE B+CM,7:POKE A,32:A=B
    :J=FN A(J):GOSUB 520'MHVV
320 IF PEEK(B)=28 THEN 420'EIGD
321 J=(J-1)-4*(J=0)'FKWF
322 SYS(828):R=PEEK(254)-PEEK(253)
    'FRMH
323 IF R=0 THEN 314'DFDE
324 W=PEEK(L+R)'DFYG
326 IF W=46 THEN L=L+R:POKE L-R,32
    :POKE L,P:POKE L+CM,10:GOSUB 510
    :GOTO 314'MGCT
327 IF W=90 THEN L=L+R:POKE L-R,32
    :POKE L,P:POKE L+CM,10:GOSUB 530
    :GOTO 314'MGDU
328 IF W<>32 THEN 314'EGIK
330 L=L+R:POKE L-R,32:POKE L,P
    :POKE L+CM,10:GOTO 314'IYAK
400 GOTO 314'BDHY
420 REM     GOBBLER EATS PLAYER'BRIF
422 GS=GS+1000'CIFF
424 FOR X=D TO D+24:POKE D,0:NEXT'GKSJ
425 POKE D+24,15:POKE D+5,15
    :POKE D+12,15:POKE D+19,15
    :POKE D+6,107'KIRS
426 POKE D+14,107:POKE D+14,50
    :POKE D+15,40'GVYO
428 POKE D+4,33:POKE D+11,23
    :POKE D+18,23'GTGP
429 FOR F1=10 TO 50 STEP 1
    :POKE D+1,F1'GNDP
430 FOR F2=30 TO 1 STEP-5
    :POKE D+8,F2'HMHI
432 NEXT F2:NEXT F1'CFTF
434 POKE D+4,32:POKE D+11,32
    :POKE D+18,32'GTFM
436 PRINT"[CLEAR]":POKE V+21,0'DGNK
438 PRINT"[DOWN10]"TAB(4)"HA!!!! THE
    GOBBLER GOBBLED YOU UP!"'CCBT
440 FOR T=0 TO 2000:NEXT:GOTO 450'FLCH
450 REM     GAME OVER'BIDF
451 FOR T=0 TO 1000:NEXT'EHPH
452 PRINT"[CLEAR]":POKE V+21,0
    :POKE 53280,0'EOKK
454 GOSUB 950'BDRI
456 IF GS>YS THEN PRINT"[DOWN8]
    "TAB(7)"HEY! THE GOBBLER WINS
    AGAIN!"'FGMV
458 IF YS>GS THEN PRINT"[DOWN8]
    "TAB(7)"UHOH....I GUESS YOU WIN
    ONE."'FGFX
460 PRINT:PRINT:PRINT TAB(8)"GOBBLER
    SCORE[SPACE2]";GS'EHCL
462 PRINT:PRINT TAB(8)"YOUR SCORE
    [SPACE6]";YS'DGLN
464 GOSUB 900'BDMJ
466 PRINT:PRINT TAB(8)"PLAY AGAIN
    [SPACE5]Y OR N"'DDPR
468 GET JUNK$:IF JUNK$<>""THEN
    468'FOCS
470 GET A$:IF A$=""THEN 470'EIKJ
472 IF A$="Y"THEN 480'DFMK
474 END'BACJ
480 GS=0:YS=0:GOTO 262'DLKK
500 GS=GS+10:PRINT"[HOME]"
    :PRINT D$"[DOWN]"TAB(6)GS
    :IF GS+YS=2590 THEN 450'JBDL
501 RETURN'BAQA
510 YS=YS+10:PRINT"[HOME]"
    :PRINT D$"[DOWN]"TAB(28)YS
    :IF GS+YS=2590 THEN 450'JCJM
512 RETURN'BAQC
520 GS=GS+100:PRINT"[HOME]"
    :PRINT D$"[DOWN]"TAB(6)GS
    :IF GS+YS=2590 THEN 450'JCBN
521 RETURN'BAQC
530 YS=YS+100:PRINT"[HOME]"
```

```
    :PRINT D$"[DOWN]"TAB(28)YS
    :IF GS+YS=2590 THEN 450'JDHO
531 RETURN'BAQD
650 END'BACF
900 REM     PLAY MUSIC'BJTG
901 RESTORE'BAOE
902 FOR L=0 TO 24:POKE D+L,0:NEXT'GKTK
904 POKE D+3,8:POKE D+5,41:POKE D+6,89
    :POKE D+14,117:POKE D+18,16
    :POKE D+24,143'MOQW
906 READ FR,DR'BFYK
908 IF FR=0 THEN RETURN'EDHO
910 POKE D+4,65'CFEG
912 FOR T=1 TO DR'DEQI
914 FQ=FR+PEEK(D+27)/2'FKLN
916 HF=INT(FQ/256):LF=FQ AND 255'FRJR
918 POKE D+0,LF:POKE D+1,HF'ELDR
920 NEXT'BAEF
922 POKE D+4,64'CFDJ
924 Q=Q+1:IF Q=198 THEN Q=192'GMWP
926 FOR T=2040 TO 2047:POKE T,Q
    :NEXT'FOCR
928 GOTO 906'BDOO
950 REM     SPRITE SETUPS'BMXM
952 FOR I=2040 TO 2047:POKE I,Q
    :NEXT'FOGQ
954 FOR I=39 TO 46:POKE V+I,7
    :NEXT'GLVS
956 POKE V+29,255:POKE V+23,255'EPYT
958 POKE V+0,26:POKE V+1,54
    :POKE V+2,165:POKE V+3,54'IYKB
960 POKE V+4,26:POKE V+5,125
    :POKE V+6,26:POKE V+7,205'IART
962 POKE V+8,165:POKE V+9,205'ENYQ
964 POKE V+16,224'CHSP
966 POKE V+10,40:POKE V+11,54'ENEU
968 POKE V+12,40:POKE V+13,125
    :POKE V+14,40:POKE V+15,205'IEQD
970 POKE V+21,255 :RETURN'DIMN
1200 REM     MUSIC DATA'BJQX
1202 DATA 9634,8,6430,2,7217,2,8101,2,
     8583,2,9634,8,6430,4,6430,4'BFKI
1204 DATA 10814,8,8583,2,9634,2,10914,
     2,12139,2,12860,8,6430,4,6430,
     4'BJCK
1206 DATA 8583,8,9634,2,8583,2,8101,2,
     7217,2,8101,8,8583,2,8101,2,7217,
     2'BMEN
1208 DATA 6430,2,6069,8,6430,2,7217,2,
     8101,2,6430,2,7217,2,12139,4,
     12139,4'BOBP
1210 DATA 12139,4,9634,8,6430,2,7217,
     2,8101,2,8583,2,9634,8,6430,4,
     6430,4'BNAI
1212 DATA 10814,8,8583,2,9634,2,10814,
     2,12139,2,12860,8,6430,4,6430,4,
     8583'BOAL
1214 DATA 8,9634,2,8583,2,8101,2,7217,
     2,8101,8,8583,2,8101,2,7217,2,
     6430,2'BOMM
1216 DATA 7217,8,8101,2,7217,2,6430,2,
     6069,2,6430,4,12860,4,12860,8,0,
     0'BLAO
1220 REM     ML JOYSTICK ROUTINE'BROC
1222 DATA 173,1,220,74,176,40,74,74,
     176,11,169,0'BNRG
1224 DATA 133,254,169,41,133,253,76,
     182,3,74,176,11,169,0,133,254,
     169,39'BMNN
1226 DATA 133,253,76,182,3,169,0,133,
     254,169,40,133,253,76,182,3,74,
     176'BLKP
1228 DATA 39,74,176,11,169,39,133,254,
     169,0,133,253,76,182,3,74,176,
     11'BKRR
1230 DATA 169,41,133,254,169,0,133,
     253,76,182,3,169,40,133,254,169,
     0'BIMJ
1232 DATA 133,253,76,182,3,74,176,11,
     169,0,133,254,169,1,133,253,76,
     182,3'BNBM
1234 DATA 74,176,11,169,1,133,254,169,
     0,133,253,76,182,3,169,0,133,
     254'BKBO
1236 DATA 133,253,173,1,220,74,74,74,
     74,74,176,7,169,1,133,80,76,203,
     3'BKDQ
1238 DATA 169,0,133,80,96,234,234'BXAK
1240 REM     ML MAZE GENERATOR'BPBD
1242 DATA 1,0,216,255,255,255,40,0,
     169,81,133,251,169,40'BVRK
1244 DATA 133,253,169,4,133,252,133,
     254,169,147,32,210,255,162'BCRN
1246 DATA 0,160,0,169,160,145,253,200,
     192,39,208,249,24,165'BYUO
1248 DATA 253,105,40,133,253,144,2,
     230,254,232,224,21,208,229'BBVR
1250 DATA 160,0,169,4,145,251,169,255,
     141,15,212,169,128,141'BAQK
1252 DATA 18,212,173,27,212,41,3,133,
     173,170,10,168,24,185'BXML
1254 DATA 0,192,101,251,133,170,185,1,
     192,101,252,133,171,24'BAQO
1256 DATA 185,0,192,101,170,133,253,
     185,1,192,101,171,133,254'BBAQ
1258 DATA 160,0,177,253,201,160,208,
     18,138,145,253,169,46,145'BBUS
1260 DATA 170,165,253,133,251,165,254,
     133,252,76,62,192,232,138'BDXL
1262 DATA 41,3,197,173,208,189,177,
     251,170,169,32,145,251,224'BBIN
1264 DATA 4,240,26,138,10,168,162,2,
     56,165,251,249,0,192'BVWO
1266 DATA 133,251,165,252,249,1,192,
     133,252,202,208,238,76,62'BBTR
1268 DATA 192,169,3,160,0,153,0,216,
     153,0,217,153,0,218,153,0,219,
     200,208'BNNV
1270 DATA 241,96,256'BKAE
1272 REM     SPRITE DATA 1'BLBH
1274 DATA 0,0,0,0,0,0,0,255,0,1,255,
     128,3,255,192,7,255,224,14,60,
     112,30'BMIS
1276 DATA 60,120,62,60,124,127,255,
     254,255,255,255,255,255,255,
     248'BGUT
```

GOBBLER'S REVENGE

```
1278 DATA 255,31,120,255,30,56,0,28,
     28,0,56,14,0,112,7,255,224,3,255,
     192'BMWW
1280 DATA 1,255,128,0,255,0'BRTG
1282 REM    SPRITE DATA 2'BLCI
1284 DATA 0,0,0,0,0,0,0,255,0,1,255,
     128,3,255,192,7,255,224'BYAQ
1286 DATA 15,241,192,31,241,192,63,
     241,196,127,255,254,255,255,
     255'BGUU
1288 DATA 255,248,255,255,248,0,127,
     252,0,63,254,0'BPLT
1290 DATA 31,255,0,15,255,128,7,255,
     224,3,255,192,1,255,128,0,255,
     0'BHRP
1292 REM    SPRITE DATA 3'BLDJ
1294 DATA 0,0,0,0,0,0,0,255,0,1,255,
     128,3,255,192,7,255,224,15,255,
     192,31'BNWU
1296 DATA 255,192,63,255,196,127,255,
     254,255,255,255,255,255,31,255,
     255,0'BNAW
1298 DATA 127,255,128,63,255,192,31,
     255,224,15,255,240,7,255,224,3,
     255,192'BOFY
1300 DATA 1,255,128,0,255,0'BRTY
1302 REM    SPRITE DATA 4'BLEB
1304 DATA 0,0,0,0,0,0,0,255,0,1,255,
     128,3,255,192,7,255,224,15,255,
     240'BKDL
1306 DATA 31,255,248,63,255,252,127,
     255,254,255,255,255,255,255,
     255'BHJN
1308 DATA 255,255,255,127,255,254,63,
     255,252,31,255,248,15,255,
     240'BGYP
1310 DATA 7,255,224,3,255,192,1,255,
     128,0,255,0'BMKE
1312 REM    SPRITE DATA 5'BLFC
1314 DATA 0,0,0,0,0,0,0,255,0,1,255,
     128,3,255,192,7,255,224,3,255,
     240'BJCM
1316 DATA 3,255,248,35,255,252,127,
     255,254,255,255,255,248,255,
     255'BGLO
1318 DATA 0,255,255,1,255,254,3,255,
     252,7,255,248'BOQN
1320 DATA 15,255,240,7,255,224,3,255,
     192,1,255,128,0,255,0'BXNH
1322 REM    SPRITE DATA 6'BLGD
1324 DATA 0,0,0,0,0,0,0,255,0,1,255,
     128,3,255,192,7,255,224,7,199,
     240'BJNN
1326 DATA 7,199,248,7,199,252,127,255,
     254,255,255,255,255,199,255'BFKP
1328 DATA 0,7,255,0,7,254,0,15,252,0,
     31,248,15,255,240,7,255,224,3,
     255,192'BOXS
1330 DATA 1,255,128,0,255,0'BRTC
```

END

THE PERSONALIZER

Continued from pg. 97

```
500 FOR Z=41768 TO 41824 STEP 2'EMZE
505 N=N+1:PRINT N;'DGHH
510 LB=PEEK(Z):HB=PEEK(Z+1)
    :LC=256*HB+LB'IWPK
530 PK=PEEK(LC):IF PK>128 THEN PRINT
    CHR$(PK-128);:GOTO 550'JYHN
535 LC=LC+1:PRINT CHR$(PK);
    :GOTO 530'FPXN
550 GOSUB 1000:IF F THEN GOSUB
    950'EJRI
590 NEXT'BAEI
800 FOR W=1 TO 5'DDWE
805 Z=V(W):GOSUB 900'CJFK
810 GOSUB 1000:IF F=0 THEN NEXT
    :GOTO 1050'GMLI
815 GOSUB 950:NEXT:GOTO 1050'DJLL
820 POKE Z,FN L(M):POKE Z+2,
    FN H(M)'FOFK
825 IF N=30 THEN POKE M,13:M=M+1'GLFP
830 FOR X=1 TO LEN(M$):C$=MID$(M$,X,1)
    :POKE M,ASC(C$):M=M+1:NEXT'LEMS
835 IF N>29 AND N<33 THEN POKE M,13
    :M=M+1'IOJS
840 POKE M,0:M=M+1'DHKJ
850 RETURN'BAQH
900 LB=PEEK(Z):HB=PEEK(Z+2)
    :LC=256*HB+LB'IWQN
915 N=N+1:PRINT N;'DGHM
920 PK=PEEK(LC):IF PK>0 THEN PRINT
    CHR$(PK);:LC=LC+1:GOTO 920'KAKR
930 RETURN'BAQG
950 M$="":PRINT"CHANGE TO WHAT?"
    :PRINT'DEJO
964 POKE 631,34:POKE 632,34
    :POKE 633,20:POKE 198,3'EBSU
965 INPUT M$:IF M$=""THEN RETURN'FFTS
966 IF N>29 THEN 820'DGDS
967 POKE Z,FN L(M):POKE Z+1,
    FN H(M)'FOEW
970 FOR X=1 TO LEN(M$)-1
    :C$=MID$(M$,X,1):POKE M,ASC(C$)
    :M=M+1:NEXT'MFBY
975 POKE M,ASC(RIGHT$(M$,1))+128
    :M=M+1'GRFW
980 PRINT:RETURN'CBVM
1000 GET K$:IF K$=""THEN 1000'EJSW
1002 PRINT'BACU
1020 F=0:IF K$=CHR$(136)THEN F=1'GMSB
1030 IF K$<>CHR$(133)THEN RETURN'GHPB
1050 POKE 49153,FN H(M)
     :POKE 49152,FN L(M)'EVDE
1060 POKE 808,237 :REM ENABLE STOP
     KEY'CVHF
1070 PRINT:PRINT CHR$(18)"PROGRAM
     OVER.. GOOD BYE":END'EGLJ
2000 FOR X=43 TO 46:PRINT"POKE";X;",";
     PEEK(X):PRINT:PRINT:NEXT
     :PRINT'JRTE
2030 POKE 43,0:POKE 44,160
     :POKE 45,PEEK(49152)
     :POKE 46,PEEK(49153)'GIIH
2040 PRINT"SAVE MESSAGES THEN ENTER
     ABOVE POKES"'BAWI
```

END

BY MATT MURBACH

Wheel
for the Commodore 64



Play Wheel of Fortune on your Commodore 64.

Most people have watched game shows. They have seen contestants experience the thrill of victory. Even those who do not win anything have fun. One of the most popular game shows is Wheel of Fortune, where contestants compete to guess the puzzle and buy prizes with the money they earn by spinning the wheel and guessing letters.

Wheel is a computer game for the Commodore 64 which is similar to the game show. When the game begins, the main screen is created. The three players and their money for that round are displayed near the top. The puzzle is in the middle and the used-letter board is at the bottom. The top three lines are used for messages, the wheel, and player input. This screen format is used for the entire game.

Included in this game are about 25 different puzzles, enough for a bunch of unique games. However, in case a puzzle is repeated, you can get a new puzzle by hitting the N key when prompted. If you do not want a new puzzle, then hit the P key. You will be informed of the round (there are a total of three) and the player who starts the round.

After that, some numbers will flash by rapidly at the top left corner of the screen. This is the wheel "spinning." To stop it, hit the space bar. You are shown what you have spun, then asked to guess a letter if a number was spun. Input a letter and hit RETURN. The letter will light up in black in its particular place or places in the puzzle (which is white with a yellow border and yellow in-between words), and the appropriate amount of money is added to your total, equal to the amount of money spun multiplied by the number of times the letter appears in the puzzle. Or you are told that the letter is not in the puzzle and you lose your turn. The appropriate player will be asked what they want to do (spin, guess the puzzle or buy a vowel). Input the first letter of your choice and hit RETURN.

There are other things that can be spun besides numbers. If you spin Bankrupt, all your money in that round is lost (money accumulated from other rounds still remains), and you lose your turn. Spinning a Free Spin, available only in the first round, allows you to avoid losing a turn when it is used. Lose a Turn is self-explanatory.

Besides spinning, you can buy a vowel or guess the puzzle. To guess the puzzle, press G, hit RETURN, type in your guess, and hit RETURN again. If the guess is correct, you will win the money that you have accumulated in that round; otherwise, you will lose your turn. If you have less than $200, you will get $200 automatically. Totals are updated and shown to players after each round.

Press B to buy a vowel. It costs $250. Input your guess and hit RETURN. It will light up in the puzzle. If the particular vowel is not in the puzzle, you will lose your turn and still lose the $250.

Wheel includes most of the features of the television game show. To make this game simpler, there is no buying of prizes after each round and a wheel is not reproduced. The bonus round is a new addition to the television game show and it is not reproduced here.

These simplifications also make the program relatively easy to convert to other computers. This game incorporates everything else, including using many sounds similar to those found in the game show. Instructions in less detail are also included in the computer program. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Wheel

```
5 POKE 53280,Ø:POKE 53281,1:CLR
  :GOSUB 86Ø'EUVJ
6 R=1:Y=55655:D=1383:RV=1:U=1956
  :NP=22'GFAP
7 F(1)=1224:F(2)=1238:F(3)=1252
  :Z=54272:RN=RND(-TI):DIM W(3,
  24)'IXGU
1Ø FOR N1=1 TO 3:FOR N2=1 TO 24:READ A
   :W(N1,N2)=A:NEXT:NEXT'KYQI
2Ø FOR N=1 TO 3:M(N)=Ø:NEXT'FKBD
25 PRINT"[CLEAR,DOWN3,SPACE2]PLAYER 1
   [SPACE6]PLAYER 2[SPACE6]
```

```
   PLAYER 3"'BAUM
27 PRINT"[HOME,DOWN4,GREEN] "M(1)"
   [SPACE4]"'BEYH
29 PRINT"[HOME,DOWN4,GREEN]
   "TAB(15)M(2)"[SPACE4]"'CHSK
31 PRINT"[HOME,DOWN4,GREEN]
   "TAB(29)M(3)"[SPACE4,RED]"'CHCD
33 FOR N=1 TO 3:IF FS(P)>0 THEN FOR
   J=1 TO FS(P):X=J*2+F(P):POKE X,81
   :POKE X+Z,0:NEXT'QLFU
34 NEXT'BAED
35 I=INT(NP*RND(1)+1):FOR N=1 TO NP
   :READ B$,A$:IF N=I THEN P$=A$
   :T$=B$'OHHU
36 NEXT'BAEF
37 PRINT"[HOME,DOWN23]USED LETTERS
   :"'BALL
38 PRINT"[HOME,DOWN9,WHITE]";
   :GOSUB 850'CFHJ
39 PRINT"[DOWN2,RED]";:GOSUB 850'CFRK
40 PRINT"[HOME,DOWN9,WHITE]"P$
   :PRINT"[DOWN2,RED]"T$'CFUD
41 FOR N=0 TO 39:POKE D-N,160
   :POKE Y-N,7:POKE D+41+N,160
   :POKE Y+41+N,7:NEXT'OIUR
42 FOR N=1 TO 40:IF PEEK(D+N)=32 THEN
   POKE D+N,160:POKE Y+N,7'MWQO
43 NEXT'BAED
44 FOR N=1 TO LEN(P$):IF PEEK(D+N)=39
   OR PEEK(D+N)=45 THEN POKE Y+N,
   0'PXVT
45 NEXT'BAEF
46 PRINT"[HOME]HIT [RVS]N[RVOFF]
    FOR NEW PUZZLE, [RVS]P[RVOFF]
    TO PLAY PUZZLE"'BAOS
47 GET G$:IF G$=""THEN 47'EHAL
48 IF G$="N"THEN RESTORE
   :FOR N=1 TO 72+NP*(R-1):READ XP$
   :NEXT:GOTO 35'NVKV
49 GOSUB 840:PRINT"[HOME]ROUND"R
   :FOR N=1 TO 1200:NEXT
   :GOSUB 840'HRUS
50 P=R:PRINT"[HOME]PLAYER"P"STARTS
   THE ROUND":FOR N=1 TO 1200
   :NEXT'GMEO
51 GOSUB 840'BDPD
52 PRINT"[HOME,DOWN,SPACE2]
   HIT THE SPACE BAR TO STOP THE
   WHEEL"'BAMN
54 PRINT"[HOME]";TAB(14)W(R,RV)'CLEI
55 GET G$:IF G$=" "THEN 61'EHCK
58 RV=RV+1:IF RV=25 THEN RV=1'GNXQ
60 GOSUB 840:GOTO 54'CGJE
61 PRINT"[HOME,DOWN]";:GOSUB 850'CFQF
62 ON-(W(R,RV)=1)-2*(W(R,
   RV)=2)-3*(W(R,RV)=3)GOTO 200,220,
   240'KSTT
63 FOR N=1 TO 1500:NEXT'EHPI
65 GOSUB. 840:INPUT"[HOME]LETTER";
   L$'CHXL
67 IF ASC(L$)<65 OR ASC(L$)>90 OR
   LEN(L$)<>1 THEN 65'LTQU
68 IF L$="A"OR L$="E"OR L$="I"OR
   L$="O"OR L$="U"THEN 65'LMBV
69 FOR N=1 TO LEN(P$):JK=(PEEK(Y+N)
   AND 15)'IRPU
70 IF JK=0 AND PEEK(D+N)=ASC(L$)-64
   THEN PRINT"[HOME]";L$" HAS BEEN
   CALLED":GOTO 960'LUGS
71 IF CHR$(PEEK(D+N)+64)=L$THEN GOSUB
   450:POKE Y+N,0:L=L+1:TL=TL+1'ODQT
72 IF PEEK(D+N)=160 THEN 75'FJDK
73 DN=PEEK(D+N):IF DN=1 OR DN=5 OR
   DN=9 OR DN=15 OR DN=21 THEN 75'OBFV
74 CN=CN+1'CFYJ
75 NEXT'BAEI
76 IF L=0 THEN GOSUB 350
   :FOR Q=1 TO 999:NEXT:GOSUB 840'JQAR
77 CO=CN-TL:GOSUB 840'DKFO
78 M(P)=M(P)+L*W(R,RV)'DQDQ
79 PRINT"[HOME,DOWN4]";:GOSUB 850'CFRO
80 PRINT"[HOME,DOWN4,GREEN] "M(1)'BECF
82 PRINT"[HOME,DOWN4,GREEN]
   "TAB(15)M(2)'CHQJ
84 PRINT"[HOME,DOWN4,GREEN]
   "TAB(29)M(3)'CHWL
87 IF CO=0 THEN PRINT"[HOME,RED]
   THERE ARE ONLY VOWELS LEFT IN THE
   PUZZLE"'EDJA
88 IF CO=0 THEN FOR N=1 TO 2000:NEXT
   :GOSUB 840'IOUT
89 IF CN=0 THEN FOR N=1 TO 500:NEXT
   :GOTO 105'INOU
90 UL=UL+2:POKE U+UL,ASC(L$)-64
   :POKE U+UL+54272,2'JCIR
92 IF L=0 AND FS(P)>0 THEN GOSUB
   160'GLCN
93 IF L>0 THEN 95'DEEK
94 P=P+1:IF P=4 THEN P=1'GICP
95 PRINT"[HOME,RED]PLAYER"P"[LEFT]
   : [RVS]S[RVOFF]PIN, [RVS]G[RVOFF]
   UESS THE PUZZLE, OR [RVS]B[RVOFF]
   UY"'BBBY
96 PRINT"[HOME,DOWN]A VOWEL"
   :INPUT O$'CDBO
98 IF O$<>"S"AND O$<>"G"AND
   O$<>"B"THEN 96'KIXW
99 PRINT"[HOME,SPACE56]"'BAVV
100 PRINT"[HOME,DOWN2,SPACE5]"'BAJV
103 ON-(O$="S")-2*(O$="B")GOTO 165,
    130'HQTG
105 INPUT"[HOME]YOUR GUESS";SP$
    :IF SP$<>P$THEN P=P+1
    :IF P=4 THEN P=1'LSPO
108 PRINT"[HOME]"SPC(67)'CDGE
110 IF SP$<>P$THEN PRINT"[HOME]WRONG!"
    :FOR N=1 TO 2000:NEXT:GOSUB 840
    :GOTO 92'LUGI
113 PRINT"[HOME]*RIGHT!*":GOSUB 300
    :FOR N=0 TO 39:IF(PEEK(Y+N)AND
    15)=1 THEN POKE Y+N,0'NXMO
114 NEXT:FOR N=1 TO 1999:NEXT
    :GOSUB 840:IF M(P)<200 THEN
    M(P)=200'KCVL
115 L=0:TL=0:CN=1:UL=0:TM(P)=TM(P)+M
    (P)'GERM
```

```
118 GOSUB 840:PRINT"[HOME]
    TOTALS AFTER ROUND":FOR N=1 TO 700
    :NEXT'GLTP
119 PRINT"[HOME,DOWN4]";
    :GOSUB 850'CFRH
120 PRINT"[HOME,DOWN4,GREEN]
     "TM(1)'BFFY
122 PRINT"[HOME,DOWN4,GREEN]
    "TAB(15)TM(2)'CIYC
123 PRINT"[HOME,DOWN4,GREEN]
    "TAB(29)TM(3):PRINT"[RED]"
    :FOR N=1 TO 2000:NEXT
    :GOSUB 840'IVBJ
124 R=R+1:IF R=4 THEN PRINT"[HOME]
    THE GAME IS OVER!":FOR N=1 TO 2500
    :NEXT:GOTO 126'LSFQ
125 GOTO 20'BCJC
126 GOSUB 840:INPUT"[HOME]
    PLAY AGAIN(Y/N)";P$
    :IF P$<>"Y"AND P$<>"N"THEN
    126'JPLQ
127 IF P$="Y"THEN RUN'ECJH
128 CLR:PRINT"[CLEAR]":END'DCNH
130 IF M(P)<250 THEN PRINT"[HOME]
    YOU DON'T HAVE ENOUGH MONEY!"
    :FOR N=1 TO 1100:NEXT'IPQN
132 IF M(P)<250 THEN GOSUB 840
    :GOTO 95'FNUF
134 M(P)=M(P)-250'CLHF
139 PRINT"[HOME,DOWN4]";
    :GOSUB 850'CFRJ
140 PRINT"[HOME,DOWN4] "M(1)'BEWA
142 PRINT"[HOME,DOWN4]"TAB(15)M(2)
    'CHQD
144 PRINT"[HOME,DOWN4]"TAB(29)M(3)
    'CHWF
145 INPUT"[HOME]VOWEL";V$'BDWG
147 IF ASC(V$)<65 OR ASC(V$)>90 THEN
    145'HPNN
148 IF V$<>"A"AND V$<>"E"AND
    V$<>"I"AND V$<>"O"AND V$<>"U"THEN
    145'QNKW
150 FOR N=1 TO LEN(P$)'EGVD
151 IF PEEK(N+Y)<>0 AND
    CHR$(PEEK(D+N)+64)=V$THEN POKE
    Y+N,0:VL=VL+1:GOSUB 450'REVT
154 NEXT'BAEE
155 UL=UL+2:POKE U+UL,ASC(V$)-64
    :POKE U+UL+54272,2'JCSR
156 IF VL=0 THEN GOSUB 840:GOSUB 350
    :PRINT"[HOME]THERE IS NO ";V$
    :FOR N=1 TO 999:NEXT N'KWFU
157 IF VL=0 AND FS(P)>0 THEN GOSUB
    160'GMNN
158 IF VL=0 THEN GOSUB 840
    :GOTO 94'FJPN
159 GOSUB 840:VL=0:GOTO 95'DKYN
160 PRINT"[HOME,RED]USE FREE
    SPIN(Y/N)?"'BAYG
161 GET FS$:IF FS$<>"Y"AND
    FS$<>"N"THEN 161'INBK
162 GOSUB 840'BDPE
163 IF FS$="N"THEN RETURN'EDAH
164 POKE F(P)+2*FS(P),32:FS(P)=FS(P)-1
    :GOTO 95'GDLP
165 CN=0:CO=0:L=0:FOR N=1 TO 500
    :NEXT N:GOTO 51'IVYP
200 GOSUB 840:PRINT"[HOME]";
    TAB(14)"FREE SPIN":FOR N=1 TO 1000
    :NEXT:GOSUB 840'IUKH
202 FS(P)=FS(P)+1'CLBC
205 POKE F(P)+2*FS(P),81
    :POKE F(P)+2*FS(P)+Z,0
    :FOR N=1 TO 600:NEXT:GOTO 95'MMSQ
220 GOSUB 840:PRINT"[HOME]";TAB(14)"
    [BLACK]BANKRUPT[RED]"
    :GOSUB 250'EMTF
222 FOR N=1 TO 500:NEXT:GOSUB 840'FKKF
225 M(P)=0:L=0'CIFG
229 PRINT"[HOME,DOWN4]";
    :GOSUB 850'CFRJ
230 PRINT"[HOME,DOWN4] [GREEN]
    "M(1)'BECA
232 PRINT"[HOME,DOWN4,GREEN]
    "TAB(15)M(2)'CHQE
234 PRINT"[HOME,DOWN4,GREEN]
    "TAB(29)M(3)'CHWG
236 FOR N=1 TO 500:NEXT N:GOTO 92'FKJK
240 PRINT"[HOME]";TAB(14)"[BLACK]
    LOSE A TURN[RED]":FOR N=1 TO 1000
    :NEXT:GOSUB 840:GOTO 92'ITEM
250 SI=54272:FOR SD=SI TO SI+24
    :POKE SD,0:NEXT:POKE SI+24,79
    :POKE SI+22,32'LNFQ
255 POKE SI+23,1:POKE SI+5,199
    :POKE SI+6,145:POKE SI+4,17
    :FOR X=255 TO 0 STEP-4'NLEW
260 POKE SI+1,X:POKE SI,60
    :FOR Q=1 TO 20:NEXT Q:NEXT X
    :POKE SI+4,16:RETURN'LDBP
300 SI=54272:FOR SD=SI TO SI+24
    :POKE SD,0:NEXT:POKE SI+24,79
    :POKE SI+22,128'LODN
305 POKE SI+21,0:POKE SI+23,1
    :POKE SI+5,144:POKE SI+6,243
    :POKE SI+4,39'KLWQ
310 POKE SI+1,67:POKE SI,15
    :FOR Q=1 TO 1500:NEXT:POKE SI+4,38
    :POKE SI+1,84'LJYM
315 POKE SI,125:POKE SI+4,39
    :FOR Q=1 TO 1500:NEXT:POKE SI+4,38
    :POKE SI+1,100'LLNR
320 POKE SI,121:POKE SI+4,39
    :FOR Q=1 TO 2000:NEXT:POKE SI+24,0
    :RETURN'KEKL
350 SI=54272:FOR SD=SI TO SI+24
    :POKE SD,0:NEXT:POKE SI+24,79'JFSO
355 POKE SI+5,128:POKE SI+6,129
    :POKE SI+4,39'GWIP
358 POKE SI+1,7:POKE SI,59
    :FOR Q=1 TO 250:NEXT
    :POKE SI+4,38'JANV
360 PRINT"[HOME]THERE IS NO "L$
    :RETURN'CDDH
450 SI=54272:FOR SD=SI TO SI+24
    :POKE SD,0:NEXT:POKE SI+24,10'JFDP
```

```
455 POKE SI+5,128:POKE SI+6,128
    :POKE SI+4,23:POKE SI+1,38'IERT
460 POKE SI,59:FOR Q=1 TO 250:NEXT Q
    :POKE SI+4,16:FOR Q=1 TO 50:NEXT Q
    :RETURN'MDYR
500 DATA 100,1,200,300,400,500,100,
    200,300,175,750,2,350,250'BBFJ
505 DATA 600,400,150,200,250,400,3,
    450,150,200,2'BOVL
510 DATA 600,200,250,1000,150,300,700,
    450,3,800,150,500,400'BAUJ
520 DATA 250,2,400,550,300,200,900,
    200,400,300,3,350,250,500,2000,
    300,800'BOXN
530 DATA 1500,2,700,500,350,400,550,
    300,200,900,200,400,300,2,600,250,
    200'BOXO
540 DATA PERSON,HARRISON FORD,TITLE,
    THE RESCUERS'BMLO
545 DATA PHRASE,CHIP OFF THE OLD
    BLOCK,PERSON,BILL RUSSELL'BTYV
550 DATA FICTIONAL CHARACTER,
    FOGHORN LEGHORN,PHRASE,
    WHERE'S THE BEEF'BFYT
560 DATA TITLE,GHOSTBUSTERS,PHRASE,
    HERE'S JOHNNY,TITLE,
    BATTLESTAR GALACTICA'BOGX
570 DATA FICTIONAL CHARACTER,
    KERMIT THE FROG,TITLE,
    BLUE SUEDE SHOES'BDTV
580 DATA PHRASE,E T PHONE HOME,
    OCCUPATION,STOCK BROKER,PLACE'BWMU
590 DATA CARSON CITY NEVADA,PLACE,
    THE GRAND CANYON,PLACE,
    BAJA CALIFORNIA'BIPY
600 DATA PLACE,SALT LAKE CITY UTAH,
    PLACE,ALBEQUERQUE NEW MEXICO,
    PLACE'BFJQ
610 DATA FLAGSTAFF ARIZONA,PLACE,
    THE ROCKY MOUNTAINS,PLACE,
    CHEYENNE WYOMING'BMMT
620 DATA PLACE,TRAVERSE CITY MICHIGAN,
    PLACE,CINCINNATI OHIO,PLACE'BDKR
630 DATA TORONTO ONTARIO,PLACE,
    INDIANAPOLIS INDIANA'BPAP
640 DATA PLACE,TRENTON NEW JERSEY,
    TITLE,THE KILLING FIELDS'BURR
650 DATA TITLE,CHARIOTS OF FIRE,TITLE,
    WE ARE THE WORLD'BPAR
655 DATA PERSON,SYLVESTER STALLONE,
    TITLE,THE GRAPES OF WRATH'BWFY
670 DATA PLACE,WESTMINSTER ABBEY,
    PHRASE,LIFE IN THE FAST LANE'BWUU
680 DATA TITLE,DUNGEONS AND DRAGONS,
    PLACE,CHARLESTON SOUTH CAROLINA,
    THING'BKQA
690 DATA TWENTY TWO GUN SALUTE,PHRASE,
    TURNABOUT IS FAIR PLAY,PHRASE'BCAY
700 DATA A PENNY SAVED IS A PENNY
    EARNED,PEOPLE'BHYK
705 DATA THE KNIGHTS OF THE ROUND
    TABLE,TITLE,DO YOU REALLY WANT TO
    HURT ME'BFXW
710 DATA PERSON,HENRY DAVID THOREAU,
    TITLE,ROCK AROUND THE CLOCK,
    TITLE'BFNS
720 DATA THE LEGEND OF SLEEPY HOLLOW,
    TITLE'BECL
730 DATA RAINDROPS KEEP FALLING ON MY
    HEAD,PHRASE'BKEO
740 DATA SEE NO EVIL HEAR NO EVIL
    SPEAK NO EVIL,TITLE'BLJQ
750 DATA THE MIDNIGHT RIDE OF PAUL
    REVERE,TITLE,BATTLE HYMN OF THE
    REPUBLIC'BHKX
760 DATA TITLE,THE STAR SPANGLED
    BANNER,PLACE,WALLA WALLA
    WASHINGTON'BEPW
770 DATA OCCUPATION,MAJOR LEAGUE
    BASEBALL PLAYER,PERSON'BSNU
780 DATA JACQUELINE KENNEDY ONASSIS,
    TITLE,AROUND THE WORLD IN EIGHTY
    DAYS'BHWB
785 DATA PHRASE,ONE IF BY LAND TWO IF
    BY SEA,TITLE,THE FRENCH
    CONNECTION'BEAE
790 DATA PEOPLE,THE NEW YORK GIANTS,
    PEOPLE,THE TAMPA BAY
    BUCCANEERS'BCNA
800 DATA PEOPLE,THE MINNESOTA VIKINGS,
    PEOPLE,THE DETROIT LIONS'BYMQ
810 DATA PEOPLE,THE CHICAGO BEARS,
    PEOPLE,THE ATLANTA FALCONS'BWJQ
820 DATA PEOPLE,THE SAN FRANCISCO
    FORTY-NINERS,PEOPLE,
    THE GREEN BAY PACKERS'BKDV
830 DATA PEOPLE,THE LOS ANGELES RAMS,
    PEOPLE,THE MINNESOTA TWINS'BYGT
835 DATA PEOPLE,THE DETROIT TIGERS,
    PEOPLE,THE BOSTON RED SOX'BVEX
840 PRINT"[HOME,SPACE40]":RETURN'CBPM
850 PRINT"[SPACE40]":RETURN'CBVN
860 PRINT"[CLEAR]";TAB(17)"[RED]
    WHEEL"'CEYM
870 PRINT"[DOWN]";TAB(12)"BY MATT
    MURBACH"'CEBP
880 INPUT"[DOWN]DO YOU WANT
    INSTRUCTIONS";IN$'BECS
890 IF LEFT$(IN$,1)="N"THEN
    RETURN'FHQP
900 PRINT"[CLEAR,DOWN2]
    WHEEL IS A GAME SIMILAR TO THE
    GAME SHOW"'BACO
910 PRINT"WHEEL OF FORTUNE.[SPACE2]
    WHEN THE GAME BEGINS,"'BAGP
920 PRINT"A SCREEN WILL BE CREATED
    WITH THE[DOWN]"'BAOO
930 PRINT"PLAYERS AND THEIR MONEY
    NEAR THE TOP, A[DOWN]"'BAIR
940 PRINT"PUZZLE IN THE MIDDLE,
     AND A USED LETTER[DOWN]"'BABR
950 PRINT"AT THE BOTTOM.[SPACE2]
    THIS SAME SCREEN FORMAT[DOWN]
    "'BAKT
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Continued on pg. 128

BY JAMES C. HILTY

Dragons!

for the Commodore 64

Save a princess and it will be love at first sight— or at least some points will be added to your score.

Once upon a time, huge fire-breathing dragons roamed the earth. These creatures were a menace because they continually kidnapped fair princesses. It is your duty as the Rescue Knight to save these fair ladies from impending doom. Your task will not be simple. It is a little known fact, but dragons were considered to be highly intelligent creatures, capable of catching brave knights and eating them for dinner. But then, don't forget that you are the Rescue Knight, which means that you are a cut above the average Prince Charming.

Dragons! is a game for the Commodore 64. Your objective is to rescue all the princesses you can before time runs out or you lose your three lives. Of course, you already figured out that Rescue Knights must have at least three lives at their disposal.

Your knight is the figure at the bottom of the screen. The princess is at the top. A blue dragon is at the upper left and a red dragon is at the lower right. A good friend of the Dragon brothers, a giant scorpion, is at the center of the screen. The dragons have cast a spell over the entire forest. If you touch a tree, you become a prisoner of the dragons. If a dragon or scorpion captures you, then you are immediately eaten.

There are three skill levels in Dragons!. Level one is fairly easy, level two is challenging, and level three is nearly impossible.

Custom characters are used to create the dragons on the title screen and are also used to create the trees in the forest. Sprites form the moving figures on the playing screen, as well as the scorpion and castle. Your knight is moved with a joystick.

The dragons move intelligently and relentlessly. They will track you down if you are not quick enough. Lines 2210 to 2230 control the speed of the dragons in the different levels and to a certain extent determine the number of trees in the forest. By changing the values of SR and SB, you can change the speed of the dragons, and by changing the value of TZ, you can change the number of trees in the forest.

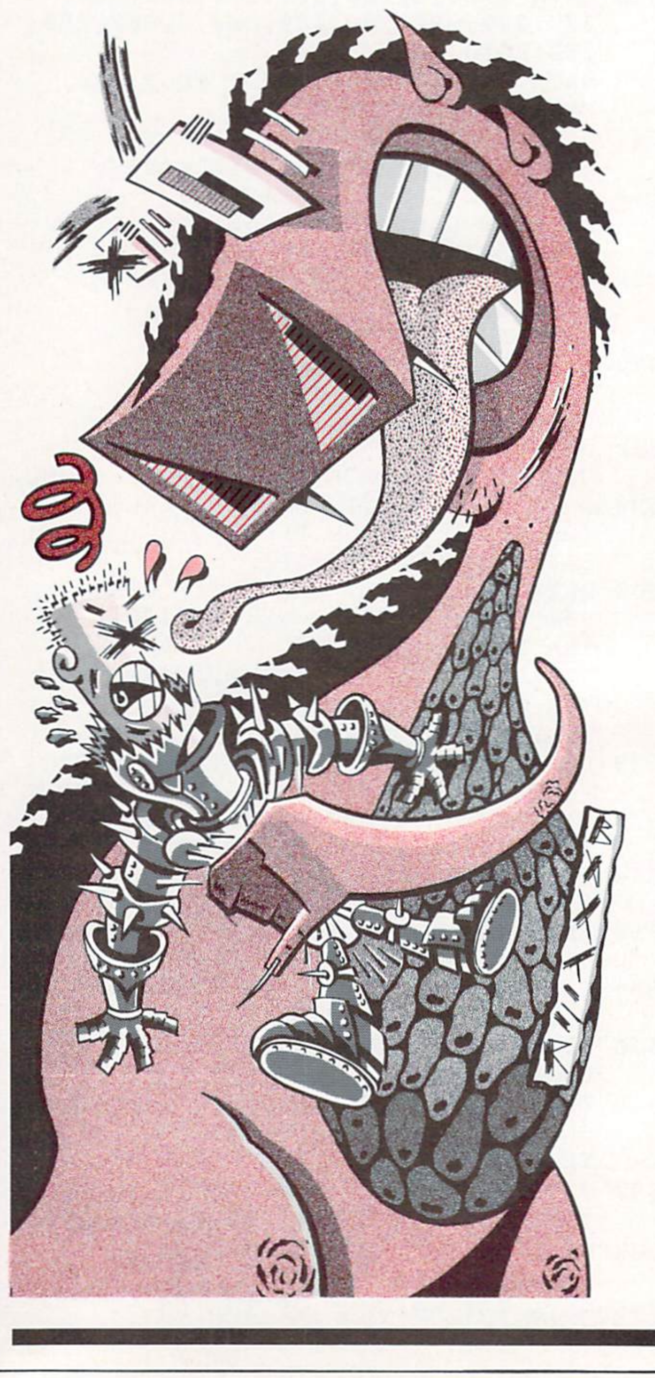
The programming of Dragons! is pretty straightforward. The custom characters are put into strings for easy printing to the screen. Variables P1 and P2 animate the two dragons by changing their sprite pointers. A short subroutine (lines 2500-2580) plays a song if you save a princess.

Prepare your plan of attack and try to rescue the princesses. Save a princess and it will be love at first sight—or at least some points added to your score. C

Before typing these programs, read "How to Enter Programs," and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Dragons!

```
20 PRINT"[CLEAR,DOWN3]PLEASE WAIT ONE
   MOMENT"'BAPF
30 DIM S$(4),S(5):TR$="[RVS,GREEN]UV
   [DOWN,LEFT2,BROWN]WX"'COXG
```



```
35 D$="[RVS,BLACK]AB[DOWN,LEFT6]TCDEF
   [DOWN,LEFT6]GHIJKLM[DOWN,LEFT7]
   NOPQRS"'BCSX
40 V=53248:SC=0:LV=3:TM=2500:HS=0
   :P1=193:P2=195:LP=1'IQQP
50 S$(0)="[HOME,DOWN,RIGHT2]"
   :FOR L=1 TO 4:S$(L)=S$(L-1)+"
   [DOWN5]":NEXT'IWQL
60 FOR L=0 TO 5:S(L)=L*5+2:NEXT'HMPJ
70 READ FR,DR:IF FR=0 THEN 80'ELVI
75 GOTO 70'BCOI
80 GOSUB 2000'BEDF
170 GOSUB 1500'BEHD
180 POKE V+4,40:POKE V+5,76
    :POKE V+6,240:POKE V+7,200
    :POKE V+8,136:POKE V+9,116'MOMT
190 POKE V+10,134:POKE V+11,52
    :POKE V+12,137:POKE V+13,216
    :POKE V+21,126'KNLS
200 C1=PEEK(V+30):C2=PEEK(V+31):X=137
    :Y=216:RX=240:RY=200:BX=40
    :BY=76'MWYP
210 REM     MAIN LOOP'BIMY
220 POKE 2042,P1:P1=P1+1
    :IF P1=195 THEN P1=193'HYBH
230 POKE 2043,P2:P2=P2+1
    :IF P2=197 THEN P2=195'HYLI
240 JY=PEEK(56321)AND 15'DLAE
250 IF JY=7 THEN X=X+3:IF X>244 THEN
    X=244'JPAK
260 IF JY=11 THEN X=X-3
    :IF X<24 THEN X=24'JORL
270 IF JY=13 THEN Y=Y+3
    :IF Y>229 THEN Y=229'JQFM
280 IF JY=14 THEN Y=Y-3
    :IF Y<50 THEN Y=50'JOWN
290 POKE V+12,X:POKE V+13,Y'ELFK
300 C1=PEEK(V+30):IF C1>64 THEN
    800'GPVE
310 C2=PEEK(V+31):IF C2>63 THEN
    805'GPDF
320 ON LP GOSUB 500,600,700:LP=LP+1
    :IF LP=4 THEN LP=1'IBNK
330 GOTO 220'BDDB
490 REM     RED DRAGON MOVEMENT'BRSM
500 Q1=SGN(X-RX)+2:Q2=SGN(Y-RY)+2'IRRI
510 ON Q1 GOSUB 530,530,540
    :ON Q2 GOSUB 550,550,560'ECTH
520 IF RX<25 THEN RX=25'EIJF
521 IF RX>244 THEN RX=244'EKDH
522 IF RY<76 THEN RY=76'EIXH
523 IF RY>229 THEN RY=229'EKLJ
525 POKE V+6,RX:POKE V+7,RY
    :RETURN'FMXM
530 RX=RX-SR:RETURN'DHEG
540 RX=RX+SR:RETURN'DHDH
550 RY=RY-SR:RETURN'DHGI
560 RY=RY+SR:RETURN'DHFJ
590 REM     BLUE DRAGON MOVEMENT'BSUN
600 Q1=SGN(X-BX)+2:Q2=SGN(Y-BY)+2'IRKJ
610 ON Q1 GOSUB 630,630,640
    :ON Q2 GOSUB 650,650,660'ECAI
620 IF BX<25 THEN BX=25'EICG
621 IF BX>244 THEN BX=244'EKCH
622 IF BY<76 THEN BY=76'EIQI
623 IF BY>229 THEN BY=229'EKFK
625 POKE V+4,BX:POKE V+5,BY
    :RETURN'FMMN
630 BX=BX-SB:RETURN'DHMG
640 BX=BX+SB:RETURN'DHLH
650 BY=BY-SB:RETURN'DHOI
660 BY=BY+SB:RETURN'DHNJ
690 REM     TIME'BEOK
700 TM=TM-10:IF TM=0 THEN 1000'FOAH
710 PRINT"[HOME,DOWN7]"TAB(33)"
    [SPACE4]":PRINT"[HOME,DOWN7]
    "TAB(32)TM'EJEI
720 RETURN'BAQD
790 REM     COLLISIONS'BKQN
800 IF C1>95 THEN 900'DHSF
805 FOR L=0 TO 24:POKE 54272+L,0
    :NEXT'GOFN
810 POKE V+23,14:POKE V+29,14
    :POKE 2046,198'FWVK
820 FOR L=0 TO 8'DDNG
830 P1=P1+1:IF P1=195 THEN P1=193'GQGM
840 P2=P2+1:IF P2=197 THEN P2=195'GQON
850 POKE 2042,P1:POKE 2043,P2'CPIL
860 POKE 54296,15:POKE 54277,80
    :POKE 54278,243:POKE 54275,4
    :POKE 54276,65'FTHT
870 FOR Z=20 TO 140 STEP 5
    :POKE 54273,Z:NEXT'GQEQ
875 POKE 54276,64:NEXT'CJPQ
880 LV=LV-1:PRINT"[HOME,DOWN12]
    "TAB(34)LV:IF LV=0 THEN 1000'HTKU
885 POKE V+23,2:POKE V+29,2
    :POKE 2046,192:POKE V+21,2
    :GOSUB 1600:GOTO 180'JKMC
890 REM     SAVE PRINCESS'BMLP
900 POKE V+21,99:POKE V+10,160
    :POKE V+11,82:POKE V+12,120
    :POKE V+13,82'KLUR
910 GOSUB 2500'BEIF
920 SC=SC+100+TM:PRINT"[HOME,DOWN20]
    "TAB(32)SC'FPAN
930 POKE V+21,2:GOSUB 1600
    :GOTO 180'EOPL
990 REM     GAME OVER'BIDO
1000 PRINT"[CLEAR]":POKE V+21,0
     :IF SC>HS THEN HS=SC'HPMB
1010 PRINT"[DOWN2]"TAB(12)"[BLUE]
     G A M E[SPACE2]O V E R"'CDCY
1020 PRINT"[DOWN8]"TAB(14)"SCORE
     [SPACE2]"SC:PRINT:PRINT
     TAB(14)"HIGH SCORE[SPACE2]
     "HS'FMGG
1030 PRINT"[DOWN4]"TAB(10)"PLAY AGAIN
     - Y OR N"'CDTC
1040 PRINT"[HOME,DOWN5]"TAB(23)D$'CFDY
1050 PRINT"[HOME,DOWN16]"TAB(8)D$
     :PRINT"[HOME,DOWN16]
     "TAB(35)D$'EKKE
1060 GET JK$:IF JK$<>""THEN 1060'FLTE
```

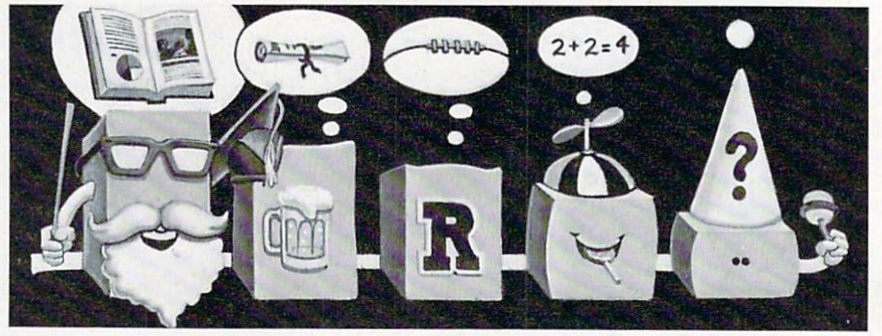
```
1070 GET I$:IF I$=""THEN 1070'EJVE
1080 IF I$="Y"THEN 1100'DGIE
1090 END'BACC
1100 SC=0:LV=3:TM=2500:GOSUB 2080
     :GOTO 170'FXUC
1490 REM   SET UP PLAYING SCREEN'BSSL
1500 PRINT"[CLEAR]"TAB(30)"[BLACK,RVS]
     @[RVOFF] DRAGON!":PRINT TAB(30)"
     [RVS]@"TAB(37)"AB"'FKDH
1510 PRINT TAB(30)"[RVS]@[RVOFF,
     SPACE2,RVS]TCDEF":PRINT TAB(30)"
     [RVS]@[RVOFF] [RVS]GHIJKLM"'EHUI
1520 PRINT TAB(30)"[RVS]@[RVOFF] [RVS]
     NOPQRS":PRINT TAB(30)"[RVS]@"
     :PRINT TAB(30)"[RVS]@[RVOFF,
     SPACE2]TIME"'GLUL
1530 PRINT TAB(30)"[RVS]@[RVOFF]
     "TAB(32)TM:PRINT TAB(30)"[RVS]@"
     :PRINT TAB(30)"[RVS]@[RVOFF]
     "'HQNK
1540 PRINT TAB(30)"[RVS]@[RVOFF]"
     :PRINT TAB(30)"[RVS]@[RVOFF,
     SPACE2]LIVES"'EHSJ
1550 PRINT TAB(30)"[RVS]@[RVOFF]
     "TAB(34)LV:FOR L=1 TO 6
     :PRINT TAB(30)"[RVS]@":NEXT'JRMN
1560 PRINT TAB(30)"[RVS]@[RVOFF,
     SPACE2]SCORE":PRINT TAB(30)"[RVS]
     @[RVOFF]"TAB(32)SC
     :PRINT TAB(30)"[RVS]@"'HQOP
1570 PRINT TAB(30)"[RVS]@[RVOFF,
     SPACE2]HIGH":PRINT TAB(30)"[RVS]
     @[RVOFF]"TAB(32)HS'FMWN
1580 GOSUB 1600:RETURN'CFCI
1590 REM    ERASE AND DRAW NEW
     FOREST'BVNN
1600 PRINT"[HOME]":FOR L=1 TO 22
     :PRINT"[SPACE29]":NEXT'GHEH
1610 FOR L=0 TO INT(RND(9)*20+TZ)
     :H=INT(RND(9)*6):CO=INT(RND(9)*5)
     'PDPQ
1620 PRINT S$(CO)TAB(S(H))TR$
     :NEXT'DPXG
1630 PRINT"[HOME,DOWN]"TAB(12)TR$
     :PRINT"[HOME,DOWN]
     "TAB(17)TR$'ENUH
1640 RETURN'BAQD
2000 REM    MOVE AND DEFINE CHARACTER
     SET'BANB
2010 CH=14336:RM=38912:POKE 53272,
     (PEEK(53272)AND 240)OR 14'GLTG
2020 POKE 56334,PEEK(56334)AND 254
     :POKE 1,PEEK(1)AND 251'GABE
2030 FOR T=CH TO CH+463
     :POKE T,PEEK(T+RM):NEXT'IRSG
2040 POKE 1,PEEK(1)OR 4
     :POKE 56334,PEEK(56334)OR 1'GVXG
2050 FOR T=CH+8*128 TO CH+8*152 STEP 8
     :FOR J=T TO T+7:READ A:POKE J,A
     :NEXT:NEXT'QCLP
2060 REM    READ SPRITE DATA'BOFE
2070 FOR L=12288 TO 12926:READ A
     :POKE L,A:NEXT'GSPI
2080 POKE 2040,199:POKE 2041,197
     :POKE 2042,193:POKE 2043,195
     :POKE 2044,201'FTCN
2082 POKE 2045,200'BIGG
2085 POKE 2046,192:POKE V+28,32
     :POKE V+37,1:POKE V+38,6
     :POKE V+44,7:POKE V+39,2'LOYW
2090 POKE V+40,12:POKE V+41,6
     :POKE V+42,2:POKE V+43,0
     :POKE V+45,1:POKE V+29,2'MLXS
2095 POKE V,144:POKE V+1,76
     :POKE V+16,2:POKE V+2,26
     :POKE V+3,158:POKE V+23,2'LLTW
2100 REM    TITLE SCREEN'BLIX
2110 POKE 53281,15:POKE 53280,0
     :PRINT"[CLEAR]"'DRSB
2120 PRINT TAB(2)"[RVS,RED]@@@"'CCKY
2130 PRINT" [RVS,BLACK]@[RED]@[BLACK]
     @[RED]@[RVOFF] [BLUE]
     NCE UPON A TIME,THERE WERE
     TWO..."'BADK
2140 PRINT" [RVS,BLACK]@[RED]@@@"
     :PRINT" [RVS,BLACK]@@@"
     :PRINT"[DOWN5]"TAB(13)"[BLUE]
     D R A G O N S !"'EFWJ
2150 PRINT:PRINT:PRINT TAB(9)"CHOOSE
     YOUR SKILL LEVEL":PRINT'FFUK
2160 PRINT TAB(15)"1-BEGINNER":PRINT
     :PRINT TAB(15)"2-EXPERIENCED"
     :PRINT'GJQM
2170 PRINT TAB(15)"3-EXPERT"
     :PRINT"[HOME,DOWN5]
     "TAB(22)D$'EJVI
2180 PRINT"[HOME,DOWN16]"TAB(8)D$
     :PRINT"[HOME,DOWN16]
     "TAB(35)D$'EKKJ
2190 GET JK$:IF JK$<>""THEN 2190'FLYJ
2200 GET I$:IF I$=""THEN 2200'EJRA
2210 IF I$="1"THEN SR=5:SB=4:TZ=10
     :RETURN'HPJF
2220 IF I$="2"THEN SR=5:SB=5:TZ=15
     :RETURN'HPQG
2230 IF I$="3"THEN SR=6:SB=4:TZ=20
     :RETURN'HPNH
2240 GOTO 2200'BEBB
2490 REM    SONG'BEWI
2500 RESTORE:FOR L=54272 TO 54296
     :POKE L,0:NEXT'GRSG
2510 POKE 54275,8:POKE 54277,41
     :POKE 54278,89:POKE 54286,117
     :POKE 54290,16'FTKL
2520 POKE 54296,143'BJAD
2530 READ FR,DR:IF FR=0 THEN
     RETURN'FJJH
2540 POKE 54276,65'BIDF
2560 FQ=FR+PEEK(54299)/2
     :HF=INT(FQ/256):LF=FQ AND
     255'JFYS
2570 POKE 54272,LF:POKE 54273,HF
     :FOR L=1 TO DR*40:NEXT'HAQP
2580 POKE 54276,64:GOTO 2530'CNSK
```

```
2900 REM     SONG DATA'BIXF
2910 DATA 5103,8,10207,8,9634,4,7647,
     2,8583,2,9634,4,10207,4,5103,8,
     8583,4'BOFR
2920 DATA 8583,4,7647,4,7647,4,7647,4,
     7647,4,4291,8,6812,8,6430,4,5103,
     2'BMIR
2930 DATA 5728,2,6430,4,6812,4,5728,4,
     4817,2,5103,2,5728,4,6430,4,5103,
     12'BNPS
2940 DATA 0,0'BDPI
3000 REM     CUSTOM CHARACTER DATA'BTRB
3010 DATA 255,255,255,255,255,255,255,
     255,0,0,0,1,6,12,28,56'BAMG
3020 DATA 0,64,128,0,0,0,0,64,0,0,0,0,
     0,0,0,33,0,0,0,8,28,63,113,
     227'BILI
3030 DATA 0,3,15,63,255,255,255,255,
     121,243,230,252,248,224,192,
     128'BHDJ
3040 DATA 0,0,1,3,2,1,0,0,63,127,240,
     192,28,227,1,2,255,255,255,15,3,
     0,0,0'BOBL
3050 DATA 199,255,255,255,207,31,63,
     127,254,252,251,255,255,255,255,
     255'BLBM
3060 DATA 3,15,255,255,255,252,192,
     224,255,255,255,255,255,0,0,0,1,
     62'BJVM
3070 DATA 192,63,0,0,0,0,252,1,254,0,
     0,7,1,0,0,193,35,71,143,31,255,
     63'BKWN
3080 DATA 255,252,248,240,224,192,192,
     0,112,60,15,3,0,0,0,0'BYKM
3090 DATA 28,2,241,200,4,0,0,0,0,0,0,
     0,0,0,2,6,31,1,59,87,95,172,199,
     205'BMJQ
3100 DATA 128,143,121,76,108,184,111,
     184,1,1,1,1,1,1,3,63'BWOF
3110 DATA 192,192,192,192,192,224,240,
     252'BGMD
3200 REM     SPRITE DATA'BKCA
3210 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
     0,1,0,0,15,152,192,2,25,224,2,17,
     224'BONK
3220 DATA 2,121,224,3,255,224,0,121,
     224,0,48,192,0,60,0,0,36,0,0,100,
     0'BKDK
3230 DATA 0,68,0,0,70,0,0,96,0,0,0,0,
     0,0,0,0,0,0,0,0,1,192'BXUJ
3240 DATA 0,3,96,1,7,240,0,143,248,0,
     78,0,0,78,0,0,222,0,1,159,0'BENL
3250 DATA 1,159,0,1,191,128,1,191,128,
     1,255,128,1,254,0,0,51,0,0,59,
     128'BLKO
3260 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
     0,0'BGXJ
3270 DATA 0,0,0,0,1,192,0,3,96,0,135,
     240,1,15,128,2,14,192,2,14,112,3,
     30,0'BONQ
3280 DATA 1,159,0,1,159,0,1,191,128,1,
     191,128,1,255,128,1,254,0,0,24,
     0'BKJQ
3290 DATA 0,28,0,0,0,0,0,0,0,0,0,0,0,
     0,0,0,0,0,0,0,0,0,3'BVPO
3300 DATA 128,0,6,192,0,15,224,128,31,
     241,0,0,114,0,0,114,0,0,123,
     0'BHHJ
3310 DATA 0,249,128,0,249,128,1,253,
     128,1,253,128,1,255,128,0,127,
     128'BJTK
3320 DATA 0,240,0,0,1,220,0,0,0,0,0,0,
     0,0,0,0,0,0,0,0,0,0,0,0,0,0,3,
     128'BLJL
3330 DATA 0,6,192,0,15,225,0,1,241,
     128,3,112,64,14,112,64,0,120,
     192'BHGM
3340 DATA 0,249,128,0,249,128,1,253,
     128,1,253,128,1,255,128,0,127,
     128'BJTN
3350 DATA 0,24,0,0,56,0,0,0,0,0,0,0,
     0,0,0,0,0,0,0,0,0,0,0,0,0,0,
     0'BJBO
3360 DATA 42,0,0,42,0,0,62,0,42,62,0,
     42,54,0,62,54,0,62,54,0,54,62,
     0'BIKP
3370 DATA 54,62,42,62,62,62,63,255,62,
     63,255,28,55,255,28,55,247,
     252'BIBQ
3380 DATA 55,227,180,255,193,252,255,
     193,252,255,255,252,255,255,252,
     0'BKRS
3390 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
     0,0,0,0,0,0,0,0,0,0,0,0,0,
     0'BJFS
3400 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
     0,0,0,0,0,2,0,6,226,0,7,254,
     126'BJMK
3410 DATA 0,0,0,0,0,0,0,0,0,0,0,0,
     0'BCTF
3420 DATA 0,0,0,0,0,0,3,199,128,7,
     239,192,15,239,224,15,255,
     224'BFDM
3430 DATA 15,255,224,15,255,224,7,255,
     192,3,255,128,1,255,0,0,254,
     0'BHPN
3440 DATA 0,124,0,0,56,0,0,16,0,0,0,0,
     0,0,0,0,0,0,0,0,0,0'BWYM
3450 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
     0,0,2,128,0,1,128,0,1,128,0,0,
     128'BLLP
3460 DATA 0,0,128,0,3,128,0,3,192,0,3,
     192,0,0,192,0,0,192,0,0,192,0,3,
     240'BNPR
3470 DATA 0,15,252,0,15,252,0,0,0,0,0,
     0,28'BHWM
3480 DATA 0,0,132,0,0,68,1,224,36,3,
     48,44,6,8,60,14,4,60,28,0,28,28,
     0,12'BMVT
3490 DATA 30,0,172,31,131,200,15,255,
     200,7,255,248,3,255,0,1,126,0,3,
     53,0'BNPU
3500 DATA 6,117,128,12,68,128,8,204,
     128,0,136,128,0,128,128'BYTJ
```

END

BY R. HAROLD DROID

Memgraph-128



Memgraph lets you see how BASIC programs use memory.

Memgraph-128 creates graphic representations of how BASIC programs use memory on the Commodore 128. You can see how much RAM your program occupies, how much space the variables require and where time-consuming garbage collections occur to get a better handle on how the 128 organizes itself.

Type in Memgraph Loader. Put a disk in your drive (one with at least four blocks free) and run the program. This writes the program Memgraph-128 to disk. To use it, BLOAD"MEMGRAPH-128". Type SYS 6144 to enable the program.

Enter CLR:NEW to clear BASIC memory. Now, hold a SHIFT key down while you tap RESTORE. This is how you access Memgraph's display screen. The first thing you'll notice is that the 128 uses two separate banks for storing BASIC: one for the program text, one for variables. Most programs won't come close to using all that space.

It may puzzle you that the top eight blocks of RAM(0) are reserved. Memgraph saves this area for itself. It stores the BASIC screen display here (text and color memory) before it draws the graph. When you press SHIFT to return, it puts the screen back.

Memgraph itself sits in an unused chunk of RAM at addresses 6144-7168. According to Commodore, this space is saved for foreign language systems. If your computer speaks the same language this article is written in, you should have no problem running Memgraph.

You can observe the effects of certain BASIC commands by typing them in directly. For instance, create a large array by entering DIMA$(3000). To fill it up, enter something like FORI=1TO3000: A$(I)="FILLER":NEXT. Use the SHIFT/RESTORE combination to halt execution and see how memory fills. Or see how you can reserve space for high-resolution drawings by entering the command GRAPHIC3:GRAPHIC0. GRAPHIC CLR frees that space again.

Typing commands in direct mode is interesting, but the real reason for Memgraph is so we can understand the memory requirements of a running program. So long as Memgraph has been loaded into memory and activated with SYS 6144, you can freeze BASIC with SHIFT/RESTORE, view its usage of memory, then press SHIFT to resume exactly where it left off. Disable Memgraph by pressing RUN-STOP/RESTORE. Enable it again with SYS 6144.

Memgraph-128 makes a few allowances for the advanced features of the 128. If a program is running in fast mode, Memgraph switches to slow so you can see the display, then restores fast when it goes back to the running program. Memgraph is designed for a 40-column screen, so if a program is running in 80 columns, it temporarily switches to 40-column mode. (You may have to flick a switch on your monitor to view the graph.) And Memgraph temporarily turns sprites off, so you can see the screen without the Starship Enterprise dancing across it.

Memgraph has one drawback. The program you're investigating must be in GRAPHIC0 or text mode. For that reason, Memgraph-128 can also be called directly from BASIC via a SYS command. Insert the following line at the desired place in your program: GRAPHIC0:SYS 6147:GRAPHICX, where X is the graphic mode of the running program. If your program loops, you may find it convenient to insert a GET (not GETKEY) statement somewhere. Use the GET to check for a keypress which, if found, directs the program flow to the above series of commands.

Play with Memgraph for awhile and use it to investigate a program or two. It provides a clear picture of what's going on inside your 128. It lets you design BASIC programs that run more efficiently. And at the least, you'll have a better understanding of what happens when you type RUN. ▣

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007, 1-800-831-2694.

Memgraph Loader

```
1 REM THIS PROGRAM WRITES A FILE TO
  DISK CALLED "MEMGRAPH 128"'BJRM
2 REM SYS 6144 ENABLES NMI WEDGE
        (SHIFT/RESTORE)'BMAK
3 REM USE SYS 6147 FOR CALL FROM
        BASIC PROGRAM'BIDK
10 BANK 15:SUM=0:FOR I=6144 TO 7082
   :READ J:POKE I,J:SUM=SUM+J
   :NEXT'KIUL
15 IF SUM<>111587 THEN PRINT"ERROR IN
   DATA STATEMENTS":END'GKEO
20 BSAVE"MEMGRAPH 128",B15,
   P6144 TO P7082:END'DRTG
6144 DATA 76,6,24,76,48,24,120,
     169'BYYM
6152 DATA 27,141,24,3,169,24,141,
     25'BAGL
6160 DATA 3,32,100,26,169,0,141,
     172'BAVK
6168 DATA 27,88,96,173,172,27,208,
```

```
     5'BAHS
6176 DATA 32,111,26,176,3,76,64,
     250'BAKR
6184 DATA 169,1,141,171,27,76,56,
     24'BASQ
6192 DATA 169,0,141,171,27,32,100,
     26'BBYP
6200 DATA 169,1,141,172,27,165,215,
     240'BDJF
6208 DATA 11,169,1,141,174,27,32,
     95'BAMN
6216 DATA 255,76,81,24,169,0,141,
     174'BBTM
6224 DATA 27,173,48,208,41,1,240,
     21'BAEL
6232 DATA 169,1,141,175,27,169,0,
     141'BBMK
6240 DATA 48,208,173,17,208,9,16,
     141'BBSJ
6248 DATA 17,208,76,114,24,169,0,
     141'BBKR
6256 DATA 175,27,173,32,208,141,176,
     27'BDSQ
6264 DATA 173,163,27,141,32,208,173,
     33'BDJP
6272 DATA 208,141,177,27,173,162,27,
     141'BEIP
6280 DATA 33,208,173,21,208,141,178,
     27'BDMN
6288 DATA 169,0,141,21,208,169,0,
     133'BBDV
6296 DATA 250,133,252,169,216,133,251,
     169'BGIV
6304 DATA 247,133,253,32,204,26,169,
     0'BCIK
6312 DATA 133,250,133,252,169,4,133,
     251'BEYK
6320 DATA 169,251,133,253,32,204,26,
     169'BEJJ
6328 DATA 4,141,173,27,169,0,133,
     250'BBFQ
6336 DATA 133,252,169,4,133,251,169,
     216'BEJQ
6344 DATA 133,253,160,0,169,32,145,
     250'BDDO
6352 DATA 173,164,27,145,252,200,208,
     244'BFDO
6360 DATA 206,173,27,240,7,230,251,
     230'BDAM
6368 DATA 253,76,204,24,169,28,133,
     250'BDQU
6376 DATA 169,27,133,251,169,44,133,
     252'BENU
6384 DATA 169,4,133,253,32,153,26,
     169'BCSS
6392 DATA 60,133,250,169,27,133,251,
     169'BEJS
6400 DATA 123,133,252,32,153,26,169,
     96'BDQH
6408 DATA 133,250,169,27,133,251,169,
     114'BFHQ
6416 DATA 133,252,169,7,133,253,32,
     153'BDLO
6424 DATA 26,169,133,133,250,169,27,
     133'BEKO
6432 DATA 251,169,198,133,252,32,153,
     26'BENN
6440 DATA 169,242,133,250,169,4,133,
     251'BEGM
6448 DATA 169,250,160,12,162,227,32,
     170'BEZU
6456 DATA 26,169,222,133,250,169,4,
     133'BDMS
6464 DATA 251,169,250,162,251,160,4,
     32'BDFR
6472 DATA 170,26,173,165,27,141,114,
     219'BEFR
6480 DATA 173,167,27,141,134,219,173,
     168'BFRQ
6488 DATA 27,141,139,219,173,169,27,
     141'BEPY
6496 DATA 146,219,173,170,27,141,198,
     219'BFSX
6504 DATA 173,166,27,141,211,219,169,
     242'BFKN
6512 DATA 133,250,169,216,133,251,160,
     12'BFUM
6520 DATA 165,46,56,233,28,170,173,
     166'BDYK
6528 DATA 27,32,170,26,173,17,18,
     56'BAQS
6536 DATA 229,46,170,173,165,27,32,
     170'BDRR
6544 DATA 26,173,19,18,56,237,17,
     18'BAAQ
6552 DATA 170,173,170,27,32,170,26,
     169'BDOP
6560 DATA 255,56,237,19,18,170,173,
     166'BDCO
6568 DATA 27,32,170,26,169,222,133,
     250'BDHW
6576 DATA 169,216,133,251,160,4,165,
     48'BDQV
6584 DATA 56,233,4,170,173,166,27,
     32'BBOU
6592 DATA 170,26,165,50,56,229,48,
     170'BCUT
6600 DATA 173,167,27,32,170,26,165,
     52'BCRJ
6608 DATA 56,229,50,170,173,168,27,
     32'BCUR
6616 DATA 170,26,165,54,56,229,52,
     170'BCTQ
6624 DATA 173,170,27,32,170,26,165,
     58'BCRP
6632 DATA 56,229,54,170,173,169,27,
     32'BCAO
6640 DATA 170,26,169,255,56,229,58,
     170'BDAO
6648 DATA 173,166,27,32,170,26,32,
     111'BCFV
6656 DATA 26,176,251,32,111,26,144,
     251'BDEU
6664 DATA 169,0,133,250,133,252,169,
     247'BEIU
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6672 DATA 133,251,169,216,133,253,32,
     244'BFDT
6680 DATA 26,169,0,133,250,133,252,
     169'BDLR
6688 DATA 251,133,251,169,4,133,253,
     32'BDGA
6696 DATA 244,26,173,176,27,141,32,
     208'BDOY
6704 DATA 173,177,27,141,33,208,173,
     178'BERP
6712 DATA 27,141,21,208,173,174,27,
     240'BDHN
6720 DATA 3,32,95,255,173,175,27,
     240'BBSM
6728 DATA 13,169,1,141,48,208,173,
     17'BBNU
6736 DATA 208,41,239,141,17,208,169,
     0'BCMT
6744 DATA 141,172,27,173,171,27,208,
     1'BCIS
6752 DATA 96,76,37,24,169,247,141,
     19'BBJR
6760 DATA 18,169,0,141,18,18,96,
     173'BAWQ
6768 DATA 1,220,205,1,220,208,248,
     169'BCAY
6776 DATA 191,141,0,220,173,1,220,
     201'BCIX
6784 DATA 239,240,15,169,253,141,0,
     220'BDDW
6792 DATA 173,1,220,201,127,240,3,
     24'BBOV
6800 DATA 144,1,56,169,127,141,0,
     220'BBCL
6808 DATA 96,160,0,177,250,240,10,
     48'BBIT
6816 DATA 2,41,63,145,252,200,76,
     155'BBGS
6824 DATA 26,96,224,0,240,29,145,
     250'BBKR
6832 DATA 202,192,15,240,4,200,76,
     170'BCXQ
6840 DATA 26,72,24,165,250,105,40,
     133'BCCP
6848 DATA 250,144,2,230,251,160,0,
     104'BCLX
6856 DATA 76,170,26,96,169,4,141,
     173'BBBW
6864 DATA 27,160,0,169,250,162,15,
     32'BBEV
6872 DATA 116,255,162,252,142,185,2,
     162'BEDV
6880 DATA 0,32,119,255,200,208,236,
     206'BDAT
6888 DATA 173,27,240,7,230,251,230,
     253'BDCC
6896 DATA 76,211,26,96,169,4,141,
     173'BBWB
6904 DATA 27,160,0,169,250,162,0,
     32'BAAQ
6912 DATA 116,255,162,252,142,185,2,
     162'BEDQ
6920 DATA 15,32,119,255,200,208,236,
     206'BEYP
6928 DATA 173,27,240,7,230,251,230,
     253'BDCW
6936 DATA 76,251,26,96,77,69,77,
     71'BYTV
6944 DATA 82,65,80,72,45,45,80,82'BXBU
6952 DATA 69,83,83,32,83,72,73,70'BXGT
6960 DATA 84,32,84,79,32,82,69,84'BXOS
6968 DATA 85,82,78,0,80,82,79,71'BWOA
6976 DATA 82,65,77,45,82,65,77,40'BXKA
6984 DATA 48,41,32,32,32,32,32,86'BXNX
6992 DATA 65,82,73,65,66,76,69,83'BXUX
7000 DATA 45,82,65,77,40,49,41,0'BWAD
7008 DATA 250,80,82,79,71,82,65,
     77'BYIM
7016 DATA 32,84,69,88,84,32,32,32'BXCL
7024 DATA 32,32,32,32,250,86,65,
     82'BYLK
7032 DATA 32,250,65,82,82,65,89,
     32'BYAJ
7040 DATA 250,83,84,82,0,250,70,
     82'BYNI
7048 DATA 69,69,32,83,80,65,67,69'BXUQ
7056 DATA 32,32,250,82,69,83,69,
     82'BYCP
7064 DATA 86,69,68,32,83,80,65,67'BXSO
7072 DATA 69,0,0,0,1,10,11,14'BTPM
7080 DATA 5,7,15'BGWI
```

END

USER GROUPS

Although there are almost 1000 known Commodore user groups nationwide and around the world, this list includes only those that have been officially recognized by Commodore as Approved User Groups. If your group would like to apply for Approved status, contact Pete Baczor, User Group Coordinator, at Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380.

Commodore user groups provide invaluable assistance to Commodore computerists. If you are looking for people who share your computing interests, or if you need help getting started with your computer, contact the group near you.

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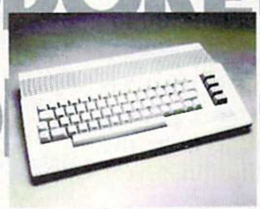
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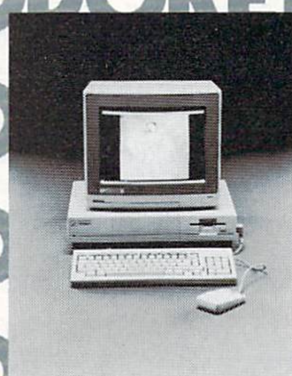
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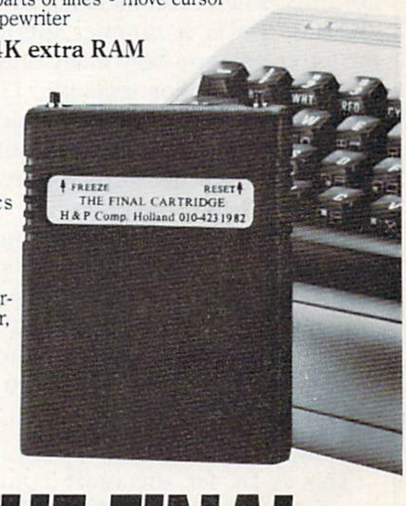
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HOW TO ENTER PROGRAMS

The programs which appear in this magazine have been run, tested and checked for bugs and errors. After a program is tested, it is printed on a letter quality printer with some formatting changes. This listing is then photographed directly and printed in the magazine. Using this method ensures the most error-free program listings possible.

Whenever you see a word inside brackets, such as [DOWN], the word represents a keystroke or series of keystrokes on the keyboard. The word [DOWN] would be entered by pressing the cursor-down key. If multiple keystrokes are required, the number will directly follow the word. For example, [DOWN4] would mean to press the cursor-down key four times. If there are multiple words within one set of brackets, enter the keystrokes directly after one another. For example, [DOWN,RIGHT2] would mean to press the cursor-down key once and then the cursor-right key twice. Note: Do not enter the commas.

In addition to these graphic symbols, the keyboard graphics are all represented by a word and a letter. The word is either SHFT or CMD and represents the SHIFT key or the Commodore key. The letter is one of the letters on the keyboard. The combination [SHIFT E] would be entered by holding down the SHIFT key and pressing the E. A number following the letter tells you how many times to type the letter. For example, [SHFT A4,CMD B3] would mean to hold the SHIFT key and press the A four times, then hold down the Commodore key and press the B three times.

The following chart tells you the keys to press for any word or words inside of brackets. Refer to this chart whenever you aren't sure what keys to press. The little graphic next to the keystrokes shows you what you will see on the screen.

Syntax Error

This is by far the most common error encountered while entering a program. Usually (sorry folks) this means that you have typed something incorrectly on the line the syntax error refers to. If you get the message "?Syntax Error Break In Line 270," type LIST 270 and press RETURN. This will list line 270 to the screen. Look for any non-obvious mistakes like a zero in place of an O or vice-versa. Check for semicolons and colons reversed and extra or missing parentheses. All of these things will cause a syntax error.

There is only one time a syntax error will tell you the wrong line to look at. If the line the syntax error refers to has a function call (e.g., FN A(3)), the syntax error may be in the line that defines the function, rather than the line named in the error message. Look for a line near the beginning of the program (usually) that has DEF FN A(X) in it with an equation following it. Look for a typo in the equation part of this definition.

Illegal Quantity Error

This is another common error message. This can also be caused by a typing error, but it is a little harder to find. Once again, list the line number that the error message refers to. There is probably a poke statement on this line. If there is, then the error is referring to what is trying to be poked. A number must be in the range of zero to 255 to be poke-able. For example, the statement POKE 1024,260 would produce an illegal quantity error because 260 is greater than 255.

Most often, the value being poked is a variable (A,X...). This error is telling you that this variable is out of range. If the variable is being read from data statements, then the problem is somewhere in the data statements. Check the data statements for missing commas or other typos.

If the variable is not coming from data statements, then the problem will be a little harder to find. Check each line that contains the variable for typing mistakes.

Out Of Data Error

This error message is always related to the data statements in a program. If this error occurs, it means that the program has run out of data items before it was supposed to. It is usually caused by a problem or typo in the data statements. Check first to see if you have left out a whole line of data. Next, check for missing commas between numbers. Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter the data.

Other Problems

It is important to remember that the 64 and the PET/CBM computers will only accept a line up to 80 characters long. The VIC 20 will accept a line up to 88 characters long and the 128 a line up to 160 characters long. Sometimes you will find a line in a program that runs over this number of characters. This is not a mistake in the listing. Sometimes programmers get so carried away crunching programs that they use abbreviated commands to get more than the standard number of characters on one line.

"[HOME]" = UNSHIFTED CLR/ HOME
"[CLEAR]" = SHIFTED CLR/HOME
"[DOWN]" = CURSOR DOWN
"[UP]" = CURSOR UP
"[RIGHT]" = CURSOR RIGHT
"[LEFT]" = CURSOR LEFT
"[RVS]" = CONTROL 9
"[RVOFF]" = CONTROL 0
"[BLACK]" = CONTROL 1
"[WHITE]" = CONTROL 2
"[RED]" = CONTROL 3
"[CYAN]" = CONTROL 4
"[PURPLE]" = CONTROL 5
"[GREEN]" = CONTROL 6
"[BLUE]" = CONTROL 7
"[YELLOW]" = CONTROL 8
"[ORANGE]" = COMMODORE 1
"[BROWN]" = COMMODORE 2
"[L. RED]" = COMMODORE 3
"[GRAY1]" = COMMODORE 4
"[GRAY2]" = COMMODORE 5
"[L. GREEN]" = COMMODORE 6
"[L. BLUE]" = COMMODORE 7
"[GRAY3]" = COMMODORE 8
"[F1]" = F1
"[F2]" = F2
"[F3]" = F3
"[F4]" = F4
"[F5]" = F5
"[F6]" = F6
"[F7]" = F7
"[F8]" = F8
"[POUND]" = ENGLISH POUND
"[SHFT ^]" = PI SYMBOL
"[^]" = UP ARROW

GRAPHIC SYMBOLS WILL BE REPRESENTED AS EITHER THE LETTERS SHFT (SHIFT) AND A KEY ("[SHFT Q,SHFT J,SHFT D,SHFT S]") OR THE LETTERS CMDR (COMMODORE) AND A KEY ("[CMDR Q,CMDR G,COMDR Y,CMDR H]"). IF A SYMBOL IS REPEATED, THE NUMBER OF REPITITIONS WILL BE DIRECTLY AFTER THE KEY AND BEFORE THE COMMA ("[SPACE3,SHFT S4,CMDR M2]").

HOW TO ENTER PROGRAMS

You can enter these lines by abbreviating the commands when you enter the line. The abbreviations for BASIC commands are in your user guide.

If you type a line that is longer than the acceptable number of characters, the computer will act as if everything is ok, until you press RETURN. Then, a syntax error will be displayed (without a line number). Many people write that the computer gives them a syntax error when they type the line, or that the computer refuses to accept a line. Both of these problems are results of typing a line that has too many characters.

The Program Won't Run!!

This is the hardest of problems to resolve; no error message is displayed, but the program just doesn't run. This can be caused by many small mistakes typing a program in. First check that the program was written for the computer you are using. Check to see if you have left out any lines of the program. Check each line of the program for typos or missing parts. Finally, press the RUN/STOP key while the program is "running." Write down the line the program broke at and try to follow the program backwards from this point, looking for problems.

If All Else Fails

You've come to the end of your rope. You can't get the program to run and you can't find any errors in your typing. What do you do? As always, we suggest that you try a local user group for help. In a group of even just a dozen members, someone is bound to have typed in the same program. The user group may also have the program on a library disk and be willing to make a copy for you. For $9.95 per issue, you can also get all the BASIC programs in each issue, as well, from Loadstar, P.O. Box 30007, Shreveport, LA 71130-0007.

If you do get a working copy, be sure to compare it to your own version so that you can learn from your errors and increase your understanding of programming.

If you live in the country, don't have a local user group, or you simply can't get any help, write to us. If you do write to us, include the following information about the program you are having problems with:

The name of the program
The issue of the magazine it was in
The computer you are using
Any error messages and the line numbers
Anything displayed on the screen
A printout of your listing (if possible)

All of this information is helpful in answering your questions about why a program doesn't work. A letter that simply states "I get an error in line 250 whenever I run the program" doesn't give us much to go on. Send your questions to:

Commodore Magazines
1200 Wilson Drive
West Chester, PA 19380
ATTN: Program Problem

HOW TO USE THE MAGAZINE ENTRY PROGRAMS

The Magazine Entry Programs on the next pages are two BASIC machine language programs that will assist you in entering the programs in this magazine correctly. There are versions for both the Commodore 64 and the Commodore 128. Once the program is in place, it works its magic without you having to do anything else. The program will not let you enter a line if there is a typing mistake on it, and better yet, it identifies the kind of error for you.

Getting Started

Type in the Magazine Entry Program carefully and save it as you go along (just in case). Once the whole program is typed in, save it again on tape or disk. Now RUN the program. The word POKING will appear on the top of the screen with a number. The number will increment from 49152 up to 49900 (4864-5545 on the 128) and just lets you know that the program is running. If everything is ok, the program will finish running and say DONE. Then type NEW. If there is a problem with the data statements, the program will tell you where to find the problem. Otherwise the program will say "mistake in data statements." Check to see if commas are missing, or if you have used periods instead of commas. Also check the individual data items.

Once the program has run, it is in memory ready to go. To activate the program type SYS49152 (SYS4864 on the 128), and press RETURN. You are now ready to enter the programs from the magazine. To disable the Entry Program, just type KILL (RETURN) on the 64 or SYS4867 on the 128.

The checksums for each line are the same for both the 64 and 128, so you can enter your 64 programs on the 128 if you'd like.

Typing the Programs

All the BASIC program listings in this magazine that are for the 64 or 128 have an apostrophe followed by four letters at the end of the line (e.g., 'ACDF). If you plan to use the Magazine Entry Program to enter your programs, the apostrophe and letters **should** be entered along with the rest of the line. This is a checksum that the Magazine Entry Program uses.

Enter the line and the letters at the end and then press RETURN, just as you normally would.

If the line is entered correctly, a bell is sounded and the line is entered into the computer's memory (without the characters at the end).

If a mistake was made while entering the line, a noise is sounded and an error message is displayed. Read the error message, then press any key to erase the message and correct the line.

IMPORTANT

If the Magazine Entry Program sees a mistake on a line, it **does not** enter that line into memory. This makes it impossible to enter a line incorrectly.

Error Messages and What They Mean

There are five error messages that the Magazine Entry Program uses. Here they are, along with what they mean and how to fix them.

Continued next page

HOW TO USE THE MAGAZINE ENTRY PROGRAMS

NO CHECKSUM: This means that you forgot to enter the apostrophe and the four letters at the end of the line. Move the cursor to the end of the line you just typed and enter the checksum.

QUOTE: This means that you forgot (or added) a quote mark somewhere in the line. Check the line in the magazine and correct the quote.

KEYWORD: This means that you have either forgotten a command or spelled one of the BASIC keywords (GOTO, PRINT. .) incorrectly. Check the line in the magazine again and check your spelling.

OF CHARACTERS: This means that you have either entered extra characters or missed some characters. Check the line in the magazine again. This error message will also occur if you misspell a BASIC command, but create another keyword in doing so. For example, if you misspell PRINT as PRONT, the 64 sees the letter P and R, the BASIC keyword ON and then the letter T. Because it sees the keyword ON, it thinks you've got too many characters, instead of a simple misspelling. Check spelling of BASIC commands if you can't find anything else wrong.

UNIDENTIFIED: This means that you have either made a simple spelling error, you typed the wrong line number, or you typed the checksum incorrectly. Spelling errors could be the wrong number of spaces inside quotes, a variable spelled wrong, or a word misspelled. Check the line in the magazine again and correct the mistake. ■

MAGAZINE ENTRY PROGRAM—64

The Magazine Entry Programs are available on disk, along with the other programs in this magazine, for $9.95. To order, contact Loadstar at 1-800-831-2694.

```
10 PRINT"[CLEAR]POKING -";
20 P=49152 :REM $CØØØ  (END AT
   4990Ø/$C2EC)
3Ø READ A$:IF A$="END"THEN 11Ø
4Ø L=ASC(MID$(A$,2,1))
5Ø H=ASC(MID$(A$,1,1))
6Ø L=L-48:IF L>9 THEN L=L-7
7Ø H=H-48:IF H>9 THEN H=H-7
8Ø PRINT"[HOME,RIGHT12]"P;
9Ø IF H>15 OR L>15 THEN PRINT
   :PRINT"DATA ERROR IN LINE";
   1ØØØ+INT((P-49152)/8):STOP
1ØØ B=H*16+L:POKE P,B:T=T+B:P=P+1
   :GOTO 3Ø
11Ø IF T<>862ØØ THEN PRINT
   :PRINT"MISTAKE IN DATA --> CHECK
   DATA STATEMENTS":END
12Ø PRINT"DONE":END
1ØØØ DATA 4C,1F,CØ,ØØ,ØØ,ØØ,ØØ,ØØ
1ØØ1 DATA ØØ,ØØ,ØØ,ØØ,ØØ,ØD,ØØ,21
1ØØ2 DATA C1,27,C1,2F,C1,3F,C1,4C
1ØØ3 DATA C1,EA,EA,EA,4C,54,CØ,A2
1ØØ4 DATA Ø5,BD,19,CØ,95,73,CA,1Ø
1ØØ5 DATA F8,6Ø,6Ø,AØ,Ø3,B9,ØØ,Ø2
1ØØ6 DATA D9,Ø4,C1,DØ,F5,88,1Ø,F5
1ØØ7 DATA AØ,Ø5,B9,A2,E3,99,73,ØØ
1ØØ8 DATA 88,1Ø,F7,A9,ØØ,8D,18,D4
1ØØ9 DATA 4C,EF,CØ,E6,7A,DØ,Ø2,E6
1Ø1Ø DATA 7B,4C,79,ØØ,A5,9D,FØ,F3
1Ø11 DATA A5,7A,C9,FF,DØ,ED,A5,7B
1Ø12 DATA C9,Ø1,DØ,E7,2Ø,2B,CØ,AD
1Ø13 DATA ØØ,Ø2,2Ø,74,CØ,9Ø,DC,AØ
1Ø14 DATA ØØ,4C,A9,C1,C9,3Ø,3Ø,Ø6
1Ø15 DATA C9,3A,1Ø,Ø2,38,6Ø,18,6Ø
1Ø16 DATA C8,B1,7A,C9,2Ø,DØ,Ø3,C8
1Ø17 DATA DØ,F7,B1,7A,6Ø,18,C8,B1
1Ø18 DATA 7A,FØ,37,C9,22,FØ,F5,6D
1Ø19 DATA Ø3,CØ,8D,Ø3,CØ,AD,Ø4,CØ
1Ø2Ø DATA 69,ØØ,8D,Ø4,CØ,4C,8E,CØ
1Ø21 DATA 18,6D,Ø5,CØ,8D,Ø5,CØ,9Ø
1Ø22 DATA Ø3,EE,Ø6,CØ,EE,Ø9,CØ,4C
1Ø23 DATA CE,C1,18,6D,Ø8,CØ,8D,Ø8
1Ø24 DATA CØ,9Ø,Ø3,EE,Ø7,CØ,EE,ØA
1Ø25 DATA CØ,6Ø,ØA,A8,B9,ØF,CØ,85
1Ø26 DATA FB,B9,1Ø,CØ,85,FC,AØ,ØØ
1Ø27 DATA A9,12,2Ø,D2,FF,B1,FB,FØ
1Ø28 DATA Ø6,2Ø,D2,FF,C8,DØ,F6,2Ø
1Ø29 DATA BC,C2,2Ø,E4,FF,FØ,FB,AØ
1Ø3Ø DATA 18,B9,Ø8,C1,2Ø,D2,FF,88
1Ø31 DATA 1Ø,F7,68,68,A9,ØØ,8D,ØØ
1Ø32 DATA Ø2,4C,74,A4,4B,49,4C,4C
1Ø33 DATA 91,91,ØD,2Ø,2Ø,2Ø,2Ø,2Ø
1Ø34 DATA 2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,2Ø
1Ø35 DATA 2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,91
1Ø36 DATA ØD,51,55,4F,54,45,ØØ,4B
1Ø37 DATA 45,59,57,4F,52,44,ØØ,23
1Ø38 DATA 2Ø,4F,46,2Ø,43,48,41,52
1Ø39 DATA 41,43,54,45,52,53,ØØ,55
1Ø4Ø DATA 4E,49,44,45,4E,54,49,46
1Ø41 DATA 49,45,44,ØØ,4E,4F,2Ø,43
1Ø42 DATA 48,45,43,4B,53,55,4D,ØØ
1Ø43 DATA C8,B1,7A,DØ,FB,84,FD,CØ
1Ø44 DATA Ø9,1Ø,Ø3,4C,84,C1,88,88
1Ø45 DATA 88,88,88,B1,7A,C9,27,DØ
1Ø46 DATA 13,A9,ØØ,91,7A,C8,A2,ØØ
1Ø47 DATA B1,7A,9D,3C,Ø3,C8,E8,EØ
1Ø48 DATA Ø4,DØ,F5,6Ø,A9,Ø4,4C,CA
1Ø49 DATA CØ,AØ,ØØ,B9,ØØ,Ø2,99,4Ø
1Ø5Ø DATA Ø3,FØ,FØ,C8,DØ,F5,AØ,ØØ
1Ø51 DATA B9,4Ø,Ø3,FØ,E6,99,ØØ,Ø2
1Ø52 DATA C8,DØ,F5,2Ø,96,C1,4C,12
1Ø53 DATA C2,AØ,Ø9,A9,ØØ,99,Ø3,CØ
1Ø54 DATA 8D,3C,Ø3,88,1Ø,F7,A9,8Ø
1Ø55 DATA 85,Ø2,AØ,ØØ,2Ø,58,C1,2Ø
1Ø56 DATA 89,C1,2Ø,ED,C1,E6,7A,E6
1Ø57 DATA 7B,2Ø,7C,A5,AØ,ØØ,2Ø,8Ø
1Ø58 DATA CØ,FØ,DØ,24,Ø2,FØ,Ø6,4C
1Ø59 DATA A8,CØ,4C,CE,C1,C9,22,DØ
1Ø6Ø DATA Ø6,2Ø,8D,CØ,4C,CE,C1,2Ø
1Ø61 DATA BA,CØ,4C,CE,C1,AØ,ØØ,B9
1Ø62 DATA ØØ,Ø2,2Ø,74,CØ,C8,9Ø,ØA
1Ø63 DATA 18,6D,Ø7,CØ,8D,Ø7,CØ,4C
1Ø64 DATA EF,C1,88,A2,ØØ,B9,ØØ,Ø2
1Ø65 DATA 9D,ØØ,Ø2,FØ,Ø4,E8,C8,DØ
1Ø66 DATA F4,6Ø,18,AD,Ø9,CØ,69,41
1Ø67 DATA 8D,Ø9,CØ,38,AD,ØA,CØ,E9
1Ø68 DATA 19,9Ø,Ø6,8D,ØA,CØ,4C,1C
1Ø69 DATA C2,AD,ØA,CØ,69,41,8D,ØA
```

```
1070 DATA CØ,AD,Ø3,CØ,6D,Ø5,CØ,48
1071 DATA AD,Ø4,CØ,6D,Ø6,CØ,8D,ØC
1072 DATA CØ,68,6D,Ø8,CØ,8D,ØB,CØ
1073 DATA AD,ØC,CØ,6D,Ø7,CØ,8D,ØC
1074 DATA CØ,38,E9,19,9Ø,Ø6,8D,ØC
1075 DATA CØ,4C,52,C2,AD,ØC,CØ,69
1076 DATA 41,8D,ØC,CØ,AD,ØB,CØ,E9
1077 DATA 19,9Ø,Ø6,8D,ØB,CØ,4C,67
1078 DATA C2,AD,ØB,CØ,69,41,8D,ØB
1079 DATA CØ,AØ,Ø1,AD,Ø9,CØ,CD,3C
1080 DATA Ø3,DØ,2Ø,C8,AD,ØA,CØ,CD
1081 DATA 3D,Ø3,DØ,17,C8,AD,ØB,CØ
1082 DATA CD,3E,Ø3,DØ,ØE,AD,ØC,CØ
1083 DATA CD,3F,Ø3,DØ,Ø6,2Ø,CC,C2
1084 DATA 4C,4B,CØ,98,48,68,4C,CA
1085 DATA CØ,A9,2Ø,8D,ØØ,D4,8D,Ø1
1086 DATA D4,A9,Ø9,8D,Ø5,D4,A9,ØF
1087 DATA 8D,18,D4,6Ø,2Ø,A9,C2,A9
1088 DATA 81,2Ø,DF,C2,A9,8Ø,2Ø,DF
1089 DATA C2,4C,D9,C2,2Ø,A9,C2,A9
1090 DATA 11,2Ø,DF,C2,A9,1Ø,2Ø,DF
1091 DATA C2,A9,ØØ,8D,Ø4,D4,6Ø,8D
1092 DATA Ø4,D4,A2,7Ø,AØ,ØØ,88,DØ
1093 DATA FD,CA,DØ,FA,6Ø,END
```

END

MAGAZINE ENTRY PROGRAM—128

```
5 TRAP 2ØØ
1Ø PRINT"[CLEAR]POKING -";
2Ø P=4864 :REM $13ØØ  (END AT
   5545/$15A9)
3Ø READ A$:IF A$="END"THEN 11Ø
8Ø PRINT"[HOME,RIGHT12]"P;
1ØØ B=DEC(A$):POKE P,B:T=T+B:P=P+1
    :GOTO 3Ø
11Ø IF T<>59314 THEN PRINT
    :PRINT"MISTAKE IN DATA --> CHECK
    DATA STATEMENTS":END
12Ø PRINT"DONE":END
2ØØ PRINT:PRINT"DATA ERROR IN LINE";
    1ØØØ+INT((P-4864)/8):END
1ØØØ DATA 4C,1E,13,4C,3A,13,ØØ,ØØ
1ØØ1 DATA 8E,ØØ,F7,ØØ,42,41,51,57
1ØØ2 DATA ØD,ØØ,ØD,43,Ø8,14,ØE,14
1ØØ3 DATA 16,14,26,14,33,14,A9,ØØ
1ØØ4 DATA 8D,ØØ,FF,AD,Ø4,Ø3,8D,12
1ØØ5 DATA 13,AD,Ø5,Ø3,8D,13,13,A2
1ØØ6 DATA 4A,AØ,13,8E,Ø4,Ø3,8C,Ø5
1ØØ7 DATA Ø3,6Ø,AD,12,13,8D,Ø4,Ø3
1ØØ8 DATA AD,13,13,8D,Ø5,Ø3,6Ø,6C
1ØØ9 DATA 12,13,A5,7F,DØ,F9,AD,ØØ
1Ø1Ø DATA Ø2,2Ø,5B,13,9Ø,F1,AØ,ØØ
1Ø11 DATA 4C,6F,14,C9,3Ø,3Ø,Ø6,C9
1Ø12 DATA 3A,1Ø,Ø2,38,6Ø,18,6Ø,C8
1Ø13 DATA B1,3D,C9,2Ø,DØ,Ø3,C8,DØ
1Ø14 DATA F7,B1,3D,6Ø,18,C8,B1,3D
1Ø15 DATA FØ,35,C9,22,FØ,F5,6D,Ø6
1Ø16 DATA 13,8D,Ø6,13,AD,Ø7,13,69
1Ø17 DATA ØØ,8D,Ø7,13,4C,75,13,18
1Ø18 DATA 6D,Ø8,13,8D,Ø8,13,9Ø,Ø3
1Ø19 DATA EE,Ø9,13,EE,ØC,13,6Ø,18
1Ø2Ø DATA 6D,ØB,13,8D,ØB,13,9Ø,Ø3
1Ø21 DATA EE,ØA,13,EE,ØD,13,6Ø,ØA
1Ø22 DATA A8,B9,14,13,85,FB,B9,15
1Ø23 DATA 13,85,FC,AØ,ØØ,8C,ØØ,FF
1Ø24 DATA A9,12,2Ø,D2,FF,B1,FB,FØ
1Ø25 DATA Ø6,2Ø,D2,FF,C8,DØ,F6,2Ø
1Ø26 DATA 79,15,2Ø,A3,15,2Ø,E4,FF
1Ø27 DATA FØ,FB,AØ,1B,B9,EF,13,2Ø
1Ø28 DATA D2,FF,88,1Ø,F7,68,68,A9
1Ø29 DATA ØØ,8D,ØØ,Ø2,4C,B7,4D,91
1Ø3Ø DATA 91,ØD,2Ø,2Ø,2Ø,2Ø,2Ø,2Ø
1Ø31 DATA 2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,2Ø
1Ø32 DATA 2Ø,2Ø,2Ø,2Ø,2Ø,2Ø,91,ØD
1Ø33 DATA 51,55,4F,54,45,ØØ,4B,45
1Ø34 DATA 59,57,4F,52,44,ØØ,23,2Ø
1Ø35 DATA 4F,46,2Ø,43,48,41,52,41
1Ø36 DATA 43,54,45,52,53,ØØ,55,4E
1Ø37 DATA 49,44,45,4E,54,49,46,49
1Ø38 DATA 45,44,ØØ,4E,4F,2Ø,43,48
1Ø39 DATA 45,43,4B,53,55,4D,ØØ,C8
1Ø4Ø DATA B1,3D,DØ,FB,CØ,Ø9,1Ø,Ø3
1Ø41 DATA 4C,69,14,88,88,88,88,88
1Ø42 DATA B1,3D,C9,27,DØ,13,A9,ØØ
1Ø43 DATA 91,3D,C8,A2,ØØ,B1,3D,9D
1Ø44 DATA ØØ,ØB,C8,E8,EØ,Ø4,DØ,F5
1Ø45 DATA 6Ø,4C,5C,15,4C,C5,14,AØ
1Ø46 DATA Ø9,A9,ØØ,99,Ø6,13,8D,ØØ
1Ø47 DATA ØB,88,1Ø,F7,A9,8Ø,85,FD
1Ø48 DATA AØ,ØØ,2Ø,3F,14,2Ø,AE,14
1Ø49 DATA 2Ø,ØD,43,84,FA,AØ,FF,2Ø
1Ø5Ø DATA 67,13,FØ,D8,24,FD,FØ,Ø6
1Ø51 DATA 2Ø,8F,13,4C,8F,14,C9,22
1Ø52 DATA DØ,Ø6,2Ø,74,13,4C,8F,14
1Ø53 DATA 2Ø,9F,13,4C,8F,14,AØ,ØØ
1Ø54 DATA B9,ØØ,Ø2,2Ø,5B,13,C8,9Ø
1Ø55 DATA ØA,18,6D,ØA,13,8D,ØA,13
1Ø56 DATA 4C,BØ,14,88,6Ø,18,AD,ØC
1Ø57 DATA 13,69,41,8D,ØC,13,38,AD
1Ø58 DATA ØD,13,E9,19,9Ø,Ø6,8D,ØD
1Ø59 DATA 13,4C,CF,14,AD,ØD,13,69
1Ø6Ø DATA 41,8D,ØD,13,AD,Ø6,13,6D
1Ø61 DATA Ø8,13,48,AD,Ø7,13,6D,Ø9
1Ø62 DATA 13,8D,ØF,13,68,6D,ØB,13
1Ø63 DATA 8D,ØE,13,AD,ØF,13,6D,ØA
1Ø64 DATA 13,8D,ØF,13,38,E9,19,9Ø
1Ø65 DATA Ø6,8D,ØF,13,4C,Ø5,15,AD
1Ø66 DATA ØF,13,69,41,8D,ØF,13,AD
1Ø67 DATA ØE,13,E9,19,9Ø,Ø6,8D,ØE
1Ø68 DATA 13,4C,1A,15,AD,ØE,13,69
1Ø69 DATA 41,8D,ØE,13,AØ,Ø1,AD,ØC
1Ø7Ø DATA 13,CD,ØØ,ØB,DØ,2Ø,C8,AD
1Ø71 DATA ØD,13,CD,Ø1,ØB,DØ,17,C8
1Ø72 DATA AD,ØE,13,CD,Ø2,ØB,DØ,ØE
1Ø73 DATA AD,ØF,13,CD,Ø3,ØB,DØ,Ø6
1Ø74 DATA 2Ø,89,15,A4,FA,6Ø,98,48
1Ø75 DATA 68,4C,AF,13,A9,Ø4,4C,AF
1Ø76 DATA 13,A9,ØØ,8D,ØØ,FF,A9,2Ø
1Ø77 DATA 8D,ØØ,D4,8D,Ø1,D4,A9,Ø9
1Ø78 DATA 8D,Ø5,D4,A9,ØF,8D,18,D4
1Ø79 DATA 6Ø,2Ø,61,15,A9,81,2Ø,9C
1Ø8Ø DATA 15,A9,8Ø,2Ø,9C,15,4C,96
1Ø81 DATA 15,2Ø,61,15,A9,11,2Ø,9C
1Ø82 DATA 15,A9,1Ø,2Ø,9C,15,A9,ØØ
1Ø83 DATA 8D,Ø4,D4,6Ø,8D,Ø4,D4,A2
1Ø84 DATA 7Ø,AØ,ØØ,88,DØ,FD,CA,DØ
1Ø85 DATA FA,6Ø,END
```

END

Tips & Tricks

Continued from pg. 64

come part of your input when they are enclosed in quotes. The opening and closing quotation marks will not be included in the string variable you input. In fact, the only character you can't enter this way is the quotation mark itself, CHR$(34). To input a DELETE character inside your quotes, press INSERT then DELETE.

The closing quotation mark, as usual, is optional, unless you need to preserve trailing spaces in your entry.

It's easy to relieve the user of the responsibility of typing the initial quote. Just use the table below to find values for A and B, then plug them into this routine:

```
100 PRINT "YOUR ENTRY";
110 POKE A,34 : POKE B,1
120 INPUT A$
```

Don't forget the semicolon at the end of line 100.

Machine	A	B
C16	1319	239
C64	631	198
C128	842	208
Plus/4	1319	239

What you're doing here is poking a quotation mark into the keyboard buffer, where it appears as the first character in the user's response.

If you're familiar with such poking, you can make the quotation mark invisible by increasing the number of characters you put into the buffer. First poke the CHR$ equivalent of the screen background color, then poke the CHR$(34), then the CHR$ equivalent of the character color. Then poke a 3 into B to allow for the extra characters in the buffer. This version will work on the default colors of a C64:

```
100 PRINT "INVISIBLE QUOTE";
110 POKE 631,31 : POKE 632,34 : POKE 633,154 : POKE
    198,3
120 INPUT A$
```

Willard Maradona
Marietta, Ohio

INPUT with default: It's often desirable to have a default value for the variable in an INPUT statement. Here are several ways to provide for that default value. In every case, the user can override the default just by entering a different value.

The simplest default doesn't print on the screen, but is entered as the variable value when the user pressed RETURN. It's accomplished like this:

```
110 X=3 : INPUT "WHAT VALUE";X
```

When the user presses RETURN without entering anything else, X will have a value of 3. It works because when RETURN is pressed by itself, the variable retains the value it had before RETURN was pressed. If the above statement lacked the X=3 and the user pressed RETURN without making an entry, X would remain at zero or whatever other value it had previously been assigned in the program.

A better technique prints the default value to the screen, so the user can see it before he presses RETURN. Like the first technique, it can only be used when the default is known at the time the program is written. To use it, do something like this:

```
120 INPUT "WHAT NUMBER [2 spaces] 8 [3 crsr lefts]";Y
```

When the cursor appears, it will be flashing over the number 8. If the user presses RETURN without entering a different number, the computer will accept the 8 as its input.

The above technique can easily accommodate defaults of more than one character, simply by including an additional cursor left for each additional character in the default.

The most sophisticated technique can be used when the default value is not known at the time the program is written, but is calculated somewhere by the program itself. In the following example, assume that D$ is the desired default and that its value has been calculated before line 130 is executed:

```
130 PRINT "WHAT NAME[2 spaces]";D$
140 PRINT "[crsr up]";TAB(9);
150 INPUT N$
```

Line 130 prints the prompt and the calculated default value. Line 140 positions the cursor properly in preparation for the INPUT statement; note that it ends with a semicolon. The number in the TAB statement should be the same as the number of characters in your prompt, not counting the two spaces at the end. Line 150 then accepts the default input, or whatever else the user has chosen to type.

With these three techniques in your bag, you can handle any INPUT default you'll ever need. They all work with either string or numeric variables.

Mary Lee McCafferty
Butler, Pennsylvania

INPUT problems: If you try to use the INPUT statement with a prompt that is more than one screen line long, the resulting variable will include your keyboard entry and the prompt!

The way around the problem is to use a PRINT statement to print the first part of your prompt (the part that fills the first screen line), limiting your INPUT statement to the part that overflows to the next line. Since the INPUT statement is now dealing with less than a full screen line, it won't put the prompt into the value of the variable.

On a related subject, don't forget that the INPUT statement accepts everything to the right of the prompt. If you have a border on your screen, INPUT will consider it as part of your response.

Steve Dodd
Alberta, Canada



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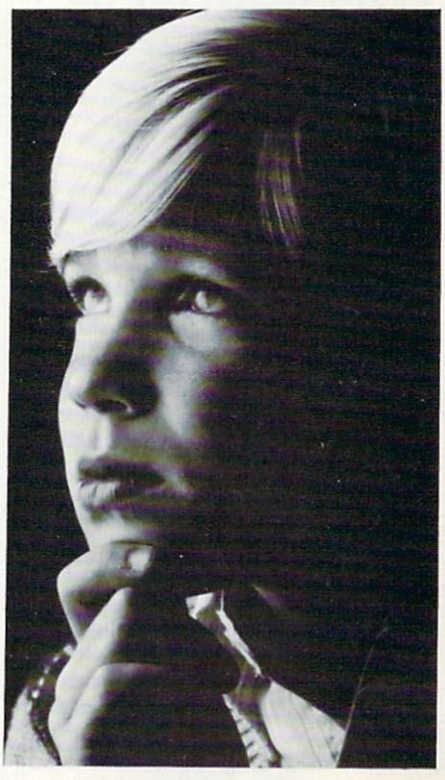
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Commodore is dedicated to seeking ways to foster a spirit of educational adventure and support the home/school connection.



COMMODORE IN EDUCATION

PARTNER 128

Continued from pg. 36

Partner 128 *lets you access utilities like a calendar, address list, memo pad and calculator while still within another 128 program.*

If you're familiar with some of Timeworks' other programs such as *Word Writer 128* or *Your Personal Financial Planner,* you know how convenient it is to be able to call up an on-screen calculator with the press of a function key. *Partner 128*'s calculator looks and operates much the same as the others, letting you add, subtract, multiply, divide and raise numbers to a power using the 128's numeric keypad. Like your $5.95 pocket calculator, *Partner 128*'s on-screen calculator has its own small display, and numbers can be stored in memory and then recalled. If you have a printer, you can even get a "paper tape" printout of your calculations by pressing F7.

While the calendar, address list, memo pad and calculator are *Partner 128*'s major features, the cartridge-based program also gives you a few other useful options. For example, you can use *Partner 128*'s Screen Print option to obtain a hard copy of any text screen from most 128 programs. There is also a DOS/Printer Commands option that lets you use disk commands such as NEW, RENAME, SCRATCH, INITIALIZE and VALIDATE, or enter printer codes for special typefaces.

Finally, to prevent your programs from being accidentally disturbed while you're away from the computer, *Partner 128*'s Swiftlock feature lets you freeze your computer until you return and enter the password you've chosen.

Partner 128 represents a breakthrough in software technology for the 128, not only because it can "invisibly" co-exist with many other 128 programs, but because its desktop accessories are first-class utilities that are easy to use and offer surprising flexibility. *Partner 128* can increase your productivity by letting you use the computing power of your 128 to the fullest. ■

GREAT BRITISH

Continued from pg. 42

/shooting contest, but appearances can be deceiving. Encompassing over 1,000 screens, *Quo Vadis* could be one of the largest and most difficult arcade games ever designed.

The object of the quest is to find the Scepter of Hope, hidden somewhere in the vast underground domain. The Scepter is your only hope to bring the downfall of the Dark Lord, who rules this evil land with hordes of vile creatures. Finding the Scepter will be hard work, but it is useless without the ancient Words of Power to energize it. These words are revealed to you throughout your journey in the form of mysterious riddles.

As players guide the story's hero through the 360-degree scrolling landscape, swarms of evil creatures attack without provocation. A shield offers some protection, but it is quickly worn out through repeated enemy hits. Magic chests must be found to replenish its power. A magic sword is also provided, which sends out steady blasts of energy in whichever direction the adventurer moves. Pressing the joystick button lets players remain motionless and fire at will. This fighting stance helps to eliminate creatures without walking into them and draining the shield. Pressing RETURN pauses the game and reveals your shield's energy level.

Besides its sheer size and complexity, what makes *Quo Vadis* so incredibly difficult is that players are allowed only one life to complete the quest. Make one mistake and it's all over. Also, if you're serious about winning this game, prepare yourself for an all-nighter—you cannot save a game in progress.

Quo Vadis presents such a formidable task, its British publisher (The Edge) has sponsored a contest for the first person to uncover the Words of Power. A real-life Scepter of Hope, worth approximately $10,000, is the prize. The contest has run for over two years without a winner.

Another interesting aspect of *Quo Vadis* is the use of a game generator. This optional feature allows player to randomize the domain each time the game is played. To win the contest, however, you must play the original layout.

British game designers may still lag behind their American counterparts in terms of overall quality, but *Great British Software* shows undeniable potential. If nothing else, this solid collection demonstrates that the true spirit of computer gaming knows no boundaries. ■

Continued from pg. 32

gain means the difference between enjoying a fast-reacting adventure or dozing off while the older drive updates information.

Trinity comes with a 26-page illustrated manual which includes examples of transcripts, a sample map, a list of recognizable verbs, important commands and a quick reference guide. The game also contains a poster-size *Trinity* site map, a sundial, and instructions for folding paper cranes (all items which have significance in the adventure).

Now if you can only decipher the importance of those items, you'll have little trouble weaving your way back to 1945. If not, you're just like the rest of us—in for a lot of challenge, frustration, surprises and even a few laughs.

If you are somewhere between a novice and expert adventurer, and are looking for a challenging adventure and have a couple of weeks to spare, you should find the unraveling of *Trinity* a rewarding, entertaining experience. The only question you need to ask yourself before you begin the quest is this—what will you do if you reach July 16, 1945, before the device is exploded? Should you change history?

Before you begin exploring the world beyond Kensington Gardens, let me give you some advice.

1. As always, keep a map of your travels. Unless you have the memory of an elephant, you will have no chance of finishing the quest without a detailed map. Save your spot often, so you can quickly retrace your steps if need be. I also suggest you keep a running list of items you find, even if you discard them. The item which seemed useless 20 steps ago may be the key to finishing later. If you recorded where you left it, you may be able to retrieve it.

2. Double-inspect every area. Try to move things—if they budge, chances are they are important to finishing the story. Keep trying to loosen them and take them with you.

3. Experiment with *Trinity*. There is a lot to enjoy here which has nothing whatsoever to do with solving the puzzle. For instance, try stepping on the grass in Kensington Gardens where the "Keep Off the Grass" sign is posted. Strange things happen. And of course, experimentation may turn up facts which are important, as well.

4. Ask questions of the people you meet. For instance, if you don't know what a gnomon is, ask the lady feeding the pigeons. Or if you don't know what a perambulator is, ask.

5. Keep track of time by glancing often at your wristwatch. Many of the events in *Trinity* are either triggered by time or must be completed before a particular time.

6. But above all—think. And try to think in a weird way. For instance, once you know what a perambulator is, and if for some reason you decided to get inside one, how would you get it to move? Well, like any good Englishman, you should think of the wind as a great source of energy. Perhaps if you had an umbrella and opened it, the wind might make the thing roll. That's a free hint. Think weird.

7. For those who have trouble escaping the Gardens, a few hints. The umbrella and perambulator are your vehicles out. But before you can use them, you must change the direction of the wind. The key to changing its direction is easy if you feed the birds. And watch out for a ruby, a loose gnomon and a roadrunner. (Yes, a roadrunner in downtown London!) ■

RINGS OF ZILFIN

Continued from pg. 22

mix well with its delightful animation to create a unique strategy/adventure. *Rings of Zilfin* is a land of fantasy, delights and pleasures, packed with deadly challenges.

Hints

1. Pick your fights very carefully. In the beginning it is often better to flee rather than fight. A clue that you are about to enter a serious battle is when the disk drive spins to update the computer's memory. With a little practice, you will be able to recognize dangerous scenery (the scenery appears a split-second before the monsters), which signals that a deadly battle is in the making. If you are still at the apprentice level, I suggest you frantically beat on the F key (for flee). By fleeing, you can avoid an unbalanced battle and the wear and tear it costs your character.

2. In the beginning, don't travel too far from your home village of Sham. Go south between Tel-Biz and Zaid picking all the mushrooms you can find. Retrace this path until you've picked all the mushrooms available. The right mushroom at a critical moment will tip the scales between victory and defeat.

3. Even though the game provides an impressive on-screen map of the lands you will be exploring, I recommend you duplicate the map in the user's manual and trace your trips. Be sure to note where you find good water, which buildings in each village are safe to enter, and be sure to mark locations where you encountered monsters.

4. Be talkative as you explore. When you encounter a begger, a monk or a villager, approach them and press T for talk. They will often reveal facts or bits of stories which will be valuable later. Be sure to write all these tidbits down. While in a tavern, it is often profitable to buy one of the other customers a drink. But be careful, they will let you buy until your gold is all spent.

5. At night, try to get to rest as quickly as possible, and if you have matches, start a fire. (A good fire almost always results in a restful night.) If spy birds approach, shoot them all down. They can't hurt you, but they will inform evil forces of your location. It only takes one spy bird to report, so if even one escapes, stop shooting and save your arrows—you'll need them when the goblins arrive. ■

MUSIC SYSTEM

Continued from pg. 46

will produce. Different MIDI keyboards respond differently to the same sound command (called a program change in MIDI terminology.)

In any event, the envelope numbers 1-15 will surely bear no relationship to your MIDI keyboard's sound programs. Therefore, you can associate a SID envelope setting with a sound program number that will have the desired effect on your MIDI keyboard. These sound settings are automatically sent to your keyboard with a MIDI program change command.

The Linker module allows you to create large compositions from smaller files that have been saved separately as music files. A linked file can consist of up to 26 different music files (one for each letter of the alphabet) and can be saved on disk for later use.

The program score-prints in conventional music notation. You can even add lyrics to your music. However, only five printers are supported: Epson FX-80, Epson RX-80 (or Epson MX-80 F/T), Star Delta 10, and Commodore's MPS-801 and MPS-802.

However, I would be suspicious even of this list, as it is entirely possible that there may be some hardware differences in "identical" models for the U.S. and British markets, especially as seen by software that uses a high-resolution graphics mode. There are several printer/interface combinations on the market that claim compatibility with the Epson or CBM models. These may work, but if score printing is important to you (it's not to me, so I haven't worried about it), you should carefully check the performance of any printer/interface combination you intend to use with this program. As far as I know, there is no way to customize the program to account for different printer characteristics.

In summary, *Advanced Music System* is a remarkably sophisticated piece of software at a very reasonable price. It is well written, thoroughly documented, and contains all the features you will ever need for accessing the SID chip. It would be a bargain even without the MIDI features that set it apart from other 64 music composing programs. If you want an affordable introduction to computer-controlled music that gives you plenty of room to grow into more sophisticated applications, this program is a perfect choice. ■

BOBSTERM 128

Continued from pg. 20

This is important because many of the files you download will be text. *BobsTerm Pro 128* supports all popular printers via printer commands either issued in direct mode or automatically saved to disk and activated at the initial loading. I have used it with a Star SG10, NEC 8023-A-C and CBM 1525 without a hitch.

Once you feel comfortable with the program, you will want to tap *BobsTerm Pro 128*'s macro capabilities. Macro files allow you to automate the terminal. If you are accessing a network and must use long distance lines, macro files can minimize the time you are on-line. A simple example would be the downloading of messages. You could design a macro to automatically dial the network, send the sign-on sequence (password, ID number), call the message board, download all the new messages, and disconnect. If you wish, the macro could even dump the buffer to the disk or printer where you could review the messages at your leisure. You could even have the program access a board while you are asleep. (Long distance rates are cheaper after midnight.)

Despite all this power, first-time users need not be afraid of *BobsTerm Pro 128*. It is packed with features that are easily mastered. At the same time, veteran terminal users should not assume that because it is easy to handle it is incomplete.

New users may find the manual a little difficult to understand at first because it uses a lot of technical language. The over 100-page manual contains a detailed table of contents, but lacks both an index and glossary. I recommend that new users approach it with a good computer dictionary in hand.

BobsTerm Pro 128's creator, Bob Lentini, maintains a 24-hour BBS called Computer Addicts Anonymous where users can contact him on-line if they experience any problems with the program.

Getting a chance to review the newest software for the 128 is always exciting, but when I get to review a product which is not only worth telling others about but I can use myself, the task becomes a double treat. *BobsTerm Pro 128* is a well-designed product that should take care of your terminal needs for a long time to come. It is logically organized so most users will be able to get on-line the same hour they open the box. ■

SOFTWARE REVIEWS/EUREKA

Continued from pg. 18

guarded.

In *Eureka!*'s first three scenarios, you receive a preset ration of vigour with which to start each journey. In the final two stages of play, when you're finally closing in on a solution, the designers were not so generous. Here vigour points must be earned, with the basis for allotment being your final score in a short pre-adventure arcade game. It's a clever little wrinkle that works well. It requires successful players to display some physical dexterity to match their mental acuteness.

Although accessible to players of all ages and experience, only a meticulous adventurer will be able to overcome the many dangers and riddles that lay around every bend along *Eureka!*'s intricate path. This game will take time and planning.

To aid the disadvantaged explorer, the instruction manual contains a clue-filled cryptic poem and accompanying illustration for each of the five legs of your journey. These are invaluable sources of information whose worth will become more apparent with each step. Study them carefully before setting off, and refer to them often. They are your keys to completion.

My only disappointment with *Eureka!* was its absence of a save feature. There are so many ways to meet defeat in these adventures that players should be able to protect themselves by occasionally saving their progress before everything is lost. Hours of work can suddenly be erased when your surrogate is trampled to death by a runaway horse that is neither seen, heard or even mentioned prior to its appearance.

In Britain, Domark offered a 25,000-pound reward for the player who first completed *Eureka!* Here in the U.S., they are offering $50,000 to the first person who solves the puzzle and saves the world. With every riddle solved, you receive part of the secret telephone number needed to call and claim the prize. The contest ends July 4, 1987.

Saving Time

In the instruction manual, Domark does its best to start explorers off on the right foot by outlining a short list of guidelines they call the "Golden Rules of Adventuring." In the same spirit, without giving away any major secrets of success, I'd like to add a few more tips that might help to make your trip a little less eventful.

- First, a quick technical note. The program's disk label gives inaccurate loading instructions. Do not leave a space between the name and number when entering the adventure title, or the disk will not load properly.
- When trying to build vigour during the pre-game arcade contests, I've had much more success using the keyboard controls as opposed to the joystick. Although it might take some initial getting used to, the keys will ultimately prove more accurate when trying to maneuver around the on-screen mazes.

Also, even in an effort to obtain bonus time, it usually doesn't make sense to make any extended chase after an enemy disk. The time you gain is often negligible when measured against your invested time of pursuit. If a disk crosses your path, nail it; but otherwise, don't go out of your way.

- When you are exploring *Eureka!*'s lands, the section will unfold in real time. So if you want to stop and rest for a minute, go ahead. But don't expect the creatures and characters around you to do the same. Pause too long to analyze a difficult or dangerous situation, and chances are you'll wind up dead way before you reach a decision. Time waits for no one, so you have to keep on your toes.

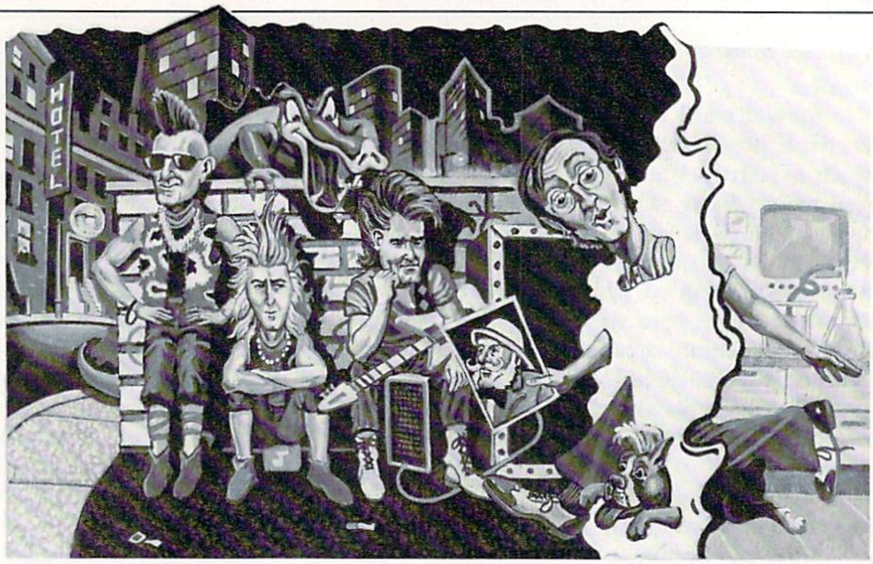
Also, never enter an unknown area unless you have a planned route of retreat. This way, if the going gets rough, you can fall back and collect your thoughts on familiar ground.

- Although there are a couple of red herrings in the chock-full-of-clue illustrations, remember that nothing was drawn and included by accident. There's a lot to be learned from these pictures, and even though the majority of tips will grow clear only with hindsight, it's well worth noting the hidden and obvious names, numbers, locations, characters, symbols and situations depicted.
- Don't be afraid to shy away from a fight. Although there are a few instances where strength-sapping battle will be your only recourse, most confrontations with the enemy can be solved without any physical conflict. If bribing, bartering or bargaining doesn't work, you might even try running. Remember, once vigour is lost, it cannot be replenished. ▣

BY SHAY ADDAMS

To Tonetown and Ymros

News and opinion from a leading explorer of those fantasy realms called adventure games.



It's not easy being on the road 52 weeks a year, especially when I have to pack a sword, lantern, laser gun, rope, spell book and assorted other gear everywhere I go. But visiting exotic places like Tonetown and Ymros make it all worthwhile.

Tass Times in Tonetown was written and designed by Michael and Muffy Berlyn. If their names sound familiar, you may remember them from Penguin's *Oo-topos*, which they designed. Michael also put in a few years at Infocom, doing games like *Cutthroats* and *Suspended* before leaving to start up Brainwave, the development company he and Muffy now run.

The story opens in the living room of a house in the Rockies. Gramps is missing, and a quick search of the house leads me and my faithful dog Spot to his secret lab. After reading the notes in his journal, I realize Gramps has discovered an entrance to another dimension, a peculiar place where guitar picks are used for money. Naturally, I scoop up a handful of picks and go looking for him.

Tonetown turns out to be a wacky world peopled by new-wave weirdos. The people jet around in freaky clothes—Troppo Wear jumpsuits and glitter hooplets—and the latest trend is to dye your hair an intense pink and stick green feathers in it. Tonetowners sprinkle their conversations with words from a hip vocabulary: "tass" means "cool," a "toner" is a person who is dressed in appropriately tass clothes.

If you don't learn what's tass and become a toner, you'll be labeled a stupid tourist. This makes it impossible to find Gramps, for the locals don't like tourists in Tonetown and would barely even talk to me until I bought some tass threads at the local Tique.

A funny thing happened to Spot when he crossed over into Tonetown: he started talking, and the first thing he told me was that his name on "this side" is Ennio. He's also the star reporter of the *Tonetown Times,* where this wee dog is known as "Ennio the Legend." Ennio's "nose for news" came in handy as I fumbled around Tonetown, and the newspaper's editor and some of the other residents also offered assistance.

There's a rock band called the Daglets, a groupie named Stelgad, and Blobo—a little furry creature known as a Blobpet. But watch out for Franklin Snarl, the villain of this story. Part pig, part raccoon and part crocodile (though mostly the latter), Snarl is a killer. If he doesn't get you, Snarl will sic the fearsome Jawdawg on you. But you'll have to confront him eventually, for Gramps is being held prisoner by the dastardly Snarl.

The game was produced by Interplay and distributed by Activision, so it uses the same interface and presentation as in *Mindshadow:* the picture and text are on the left of the screen and a joystick- or mouse-controlled interface fills the right. Former Interplay adventures displayed a list of nouns and verbs, but this one shows eight icons depicting actions such as take, talk to someone, drop—all frequently used in the game.

You can also examine an object by moving the cursor over it and hitting the button, then reading the description in the text window. A compass lets you select directions in the same no-typing style. The function keys are configured for many common commands, and I like the "quicksave" and "quickload" features that let you save and restore a game without removing the program disk.

Disk access is fast, and the best feature of the system allows you to type in several directions and go directly to the destination without stopping at any of the intermediate locations. The cartoon-style graphics incorporate lots of spot animation. *Tonetown*'s syncopated music is the best I've heard in an adventure this year, and heightens the sense of "being there" in certain places and situations.

It's a novice level game whose puzzles grow progressively more difficult and the mapping is easy. The puzzles are the kind you can't help thinking about *after*

Tips of the Month

The Bard's Tale: The Mad God's name is Tarjan. Say it in the temple and you'll get into the catacombs. Now it's up to you to find the eye, and be sure you have it before visiting Harkyn's Castle.

Trinity: To escape the nuclear missile, get in the perambulator and open the umbrella.

Oo-topos: The space suit is hidden in the garbage, which you must search, not examine. To get there, just keep pushing red buttons.

AutoDuel: Take a bus to Atlantic City and play poker, not blackjack, to win enough money to build a powerful car. Spend all points on driver and gunner skills when creating a character, since you can pay for school and learn salvage later.

you've given up for the night, and clues are cleverly concealed in the text and documentation (a copy of the *Tonetown Times*). I like *Tonetown* most because of the personable characters and the story line—and the Berlyn sense of humor that surfaced in the most unexpected places.

Before I could find Gramps, however, I received an urgent message on the Orc-Line and had to jet off to Ymros, an island paradise on the verge of catastrophe. The evil enchantress Siriadne had stolen the Shard of Spring, an enchanted gemstone. Without it, the land was growing cold and the elves and dwarves weaker, so I immediately "rolled up" a party of three warriors and two wizards to quest for the Shard.

An uncommon aspect of character creation is that *Shard of Spring* gives each character skill points to spend on other skills, in addition to the standard points for strength, intelligence and other traits. My warriors used them to acquire abilities such as berserking, hunting, and armored skin. My wizards spent them on the assorted schools of Rune Magic—Fire, Metal, Wind, Ice and Spirit—and other occult abilities. And when a character advanced a level after earning enough experience points, he was awarded more skill points to spend or to save until the next promotion so he could afford an expensive purchase. I appreciate the extra control this gives me over the development of my characters.

We set out to find Siriadne, but found many mini-quests that needed to be fulfilled before the long-range goal could be accomplished. In Green Hamlet, one of many towns seen on the aerial-view map, I heard of a priest being held by Devon the Destroyer in a maze to the south. In Oceana I was told of the treasure of Elrond Grey, and the rebels in their mountain hideout offered to help if I would bring them the head of the Swamp Thing. Each quest involves delving the depths of dangerous dungeons that reminded me of those in *Phantasie*, but were illustrated with more color and detail.

I grappled with occasional puzzles to solve, usually things like gaining entrance to a room or new region, and the necessary clues and objects were revealed when my party stepped on the correct square. I spent a lot of time experimenting with unidentified magic potions, rings of power, enchanted staffs and other gear to figure out how to use them.

Mapping the mazes was much easier than the intricate *The Bard's Tale*, but there's still a lot of mapping to do in Ymros. In one dungeon, each area is a small room with a unique shape, and all the exits are teleport doors. The only way to tell where you are is by recognizing the shape of the room. Mapping this maze is like matching the pieces of a jigsaw puzzle.

In combat, the view changes drastically. My party, instead of being depicted with a single icon as in the mazes and the aerial view, was shown as individual characters in a combat arena. This is where *Shard of Spring* excels, for its combat system isn't as repetitious as many role-playing games. Each character and monster has a speed rating, and those with higher speed ratings get more movement points so they can move faster and more frequently than the others.

In battle, a white cursor appears over the fastest character. Joystick or keyboard controls makes it easy to move him around and attack or cast spells until his movements points are depleted. Then the character or monster with the next highest rating moves, and so on until all have acted in that round and the next begins. Because my group faced a different combination of creatures in each battle—kobolds, dragons and spellcasters who were sometimes faster, sometimes slower than my characters and their own cohorts—the action was less predictable.

There are minimal sound effects, and there are a few special effects that enhance the atmosphere of Ymros' nine dungeons (four of them consist of a single small room, while others are quite extensive). The emphasis is on combat and magic, for the puzzles are fairly simple, and Strategic Simulations says the game will take 30 to 50 hours to complete. My characters attained level seven after two days and found the secret entrance to Siriadne's fire-encircled castle after a week.

This game is an intermediate level challenge: not too hard, but no pushover. Both of these games are out for the Commodore 64, and *Tonetown* is also available for the Amiga. Amiga adventurers may also now explore the *Temple of Apshai* (introductory level) and *Rogue* (advanced), both from Epyx. Electronic Arts' *Adventure Construction Set* looks, sounds and plays better in the Amiga version than any of the preceding formats. C

GAME PROGRAMS/WHEEL

Continued from pg. 105

```
960 PRINT"WILL CONTINUE THROUGHOUT
    THE GAME, BUT,[DOWN]"'BAUU
970 PRINT"OF COURSE, IT WILL BE
    UPDATED AS THE[DOWN]"'BARU
980 PRINT"GAME PROGRESSES.[DOWN]"'BAUQ
990 PRINT"[DOWN] [RVS]HIT ANY KEY TO
    CONTINUE INSTRUCTIONS[RVOFF,HOME]
    "'BAEX
1000 WAIT 198,1:POKE 198,0'CLUV
1010 PRINT"[CLEAR,DOWN2]
     YOU WILL BE ASKED IF YOU WANT A
     NEW[DOWN]"'BASE
1020 PRINT"PUZZLE.[SPACE2]
     HIT ANY KEY EXCEPT 'N' IF YOU
     [DOWN]"'BAJF
1030 PRINT"DO NOT.[SPACE2]THEN,
      SOME NUMBERS WILL FLASH[DOWN]
     "'BAVG
1040 PRINT"BY RAPIDLY AT THE TOP OF
     THE SCREEN.[DOWN]"'BAKH
1050 PRINT"THIS IS THE WHEEL
     SPINNING.[SPACE2]HIT THE[DOWN]
     "'BARI
1060 PRINT"SPACE BAR TO STOP IT.
     [SPACE2]IT WILL TELL YOU[DOWN]
     "'BAXJ
1070 PRINT"WHAT YOU HAVE SPUN.[SPACE2]
     YOU WILL BE ASKED[DOWN]"'BAFK
1080 PRINT"TO GUESS A LETTER.[SPACE2]
     INPUT IT AND HIT[DOWN]"'BAUL
1090 PRINT"[RVS]RETURN[RVOFF,DOWN2]
     "'BATF
1100 PRINT" [RVS]HIT ANY KEY TO
     CONTINUE INSTRUCTIONS[RVOFF]
     "'BASF
1110 WAIT 198,1:POKE 198,0'CLUX
1120 PRINT"[CLEAR,DOWN2]
     THE PUZZLE (WHITE SPACES WITH A
     YELLOW[DOWN]"'BADH
1130 PRINT"BORDER AND YELLOW IN
     BETWEEN WORDS) WILL"'BAUI
1140 PRINT"'LIGHT UP' THE LETTERS IN
     THEIR PLACES[DOWN]"'BAUI
1150 PRINT"IN THE WORDS OR TELL YOU
     THAT THE LETTER"'BAMK
1160 PRINT"YOU HAVE SELECTED IS NOT
     IN THE PUZZLE.[DOWN]"'BAXL
1170 PRINT"YOU WILL BE ASKED WHAT YOU
     WANT TO DO.[DOWN]"'BALL
1180 PRINT"INPUT THE FIRST LETTER OF
     YOUR CHOICE.[DOWN]"'BAQN
1190 PRINT"THE GAME WILL CONTINUE ON
     APPROPRIATELY.[DOWN]"'BAMO
1200 PRINT TAB(9)"[RVS]
     HIT ANY KEY TO BEGIN.[RVOFF]
     "'CCQC
1210 WAIT 198,1:POKE 198,0'CLUY
1220 RETURN'BAQW
1230 FOR Z=1 TO 999:NEXT:GOTO 92'FJVC
```

END

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